

Fenestra

The Blue Book
of
Steel Windows
for
Industrial Buildings

Detroit Steel Products Company
2250 East Grand Boulevard
Detroit, Michigan
1930

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Detroit Steel Products Company

Manufacturers of FENESTRA STEEL WINDOWS

2250 East Grand Boulevard

DETROIT, MICH.

Member Solid Section Steel Window Industry

(1) Experience and Facilities

Fenestra, the Latin word for "window," is also the registered trademark of the first steel window made in America. Since 1907, the DETROIT STEEL PRODUCTS COMPANY has manufactured these windows under exclusive patents covering the Fenestra joint, a process of interlocking steel bars in such a manner that strength increases at the point of intersection. The company has always enjoyed an exceptional reputation for financial soundness and is recognized as one of Michigan's strongest industrial concerns. Its product has been used on many of the largest structures in the United States. Besides the main plant covering 14½ acres in Detroit, branch plants are maintained at Oakland, California, and Toronto, Canada. The product is sold through 14 branch offices, direct agents in principal cities, dealers in towns of every size, and a world-wide export organization. Canadian sales are handled through the Canadian Metal Window and Steel Products Company, Ltd., of Toronto.

(2) Scope of This Catalogue

While the DETROIT STEEL PRODUCTS COMPANY is fully equipped to manufacture solid steel windows, doors, partitions and operators of every type and character, it is manifestly impossible to show in any catalogue the hundreds of special designs which this company can

Fenestra

supply. This catalogue, therefore, covers only such designs as have been accepted throughout the steel window industry and approved by the Depart-

ment of the Interior as the stock and standard products normally used in building.

On individual operations where windows of special design are absolutely required, layouts and detail drawings are supplied without added cost. To secure the most practical and economical window designs, we strongly recommend consultation with our branch offices and agents *at the time the building is designed.*

(3) Erection Service

The FENESTRA CONSTRUCTION COMPANY, a subsidiary of the DETROIT STEEL PRODUCTS COMPANY, offers builders the service of an organization especially equipped and trained for the erection and field painting of Fenestra Windows.

Under separate contract, this company will assume complete responsibility for the delivery, handling, erection and painting of Fenestra products and will guarantee satisfaction from the time the material leaves the factory until it is installed in the building. Twelve erection supervisors and twenty-seven experienced field superintendents are constantly employed in this work all over the United States.

GENERAL INFORMATION—READ CAREFULLY

(4) Nomenclature

Numbers designating various type of Fenestra Windows are translated as follows: first digit—number of lights in width; second digit—number of lights in height; third digit—number of ventilators or swing leaves; fourth digit—number of lights in each ventilator or leaf; fifth digit—number of lights between ventilator or swing leaf and the sill of the window. A horizontally pivoted type 35161 indicates a unit 3 lights wide, 5 lights high with one 6-light ventilator 1 light above the sill.

(5) Dimensions

In all Fenestra Windows shown in this catalogue, the window dimension is always equal to the clear opening. In other words, that part of the window frame which is embedded in the wall is not considered in the window dimensions.

(6) Stock Types

Stock types of Fenestra Windows—those types which are made up and carried in warehouses—are indi-

cated in this book by solid outline drawings, *shaded*. Standard types—those types which are not made up but for which bars are already cut and in stock at Detroit—are shown in solid outline, *not shaded*. Listed Special Windows are shown in *broken* outline. Stock types are always preferable from the standpoint of economy and quick shipment. Standard types are next best.

(7) Installation

All window openings should be so designed that steel windows may be installed after the walls are up. This is the most economical, as well as the most practical method of erection and obviates many difficulties frequently encountered when an attempt is made to set the windows as the building progresses. Rebates, clearances and angles as shown have been accepted as the best building practice and such details should be followed closely.

Steel windows are not structural members and under no circumstances should any portion of the building structure be allowed to rest on the windows.

(8) Glazing

Standard glass dimensions for horizontally pivoted units are: 12"x18" and 14"x20"; but glass in ventilators which abut on the top, sides or bottom of the ventilator must be trimmed 1" along the abutting edge. See accompanying diagram. It is desirable to cut glass full to the specified dimension.

Ordinarily, the DETROIT STEEL PRODUCTS COMPANY does not do glazing, but any Fenestra representative can refer you to reputable concerns who make a specialty of glazing steel windows.

A sufficient quantity of spring glazing clips accompanies every order of Fenestra Windows, without added cost.

After the windows have been bed puttied and glass inserted, the clips are used together with face putty to hold glass in place. On horizontally pivoted windows

use four clips for each fixed light, and six clips for each ventilator light.

The standard method of glazing architectural projected windows is with $\frac{1}{4}$ " glass or double strength glass, held by glazing angles or glazing bead. On horizontally pivoted windows $\frac{1}{4}$ " factory ribbed or wire glass or $\frac{1}{8}$ " ribbed, or double strength glass may be used.

(9) Putty

Wood sash putty never should be used with steel windows. Steel window putty should be used, and is obtainable locally. Putty may be ordered from Fenestra dealers or from company warehouses in 25, 50 and 100 pound drums. Use $\frac{1}{2}$ pound per square foot of glass area.

(10) Lists and Schedules

We recommend that all steel windows, doors, partitions or operators be accurately listed and located either in schedules on plans or in specifications. If more than one type of the same product be desired, each type should be listed and located separately.

In the case of mechanical operators, it should be clearly indicated whether the ventilators are to be operated from one or more stations and whether in single or in multiple runs. These details assure greater accuracy in estimates.

(11) Fillets to Increase Strength

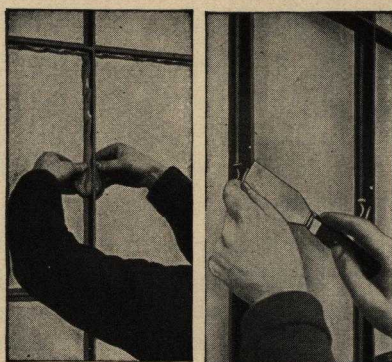
Most of the bars used in the manufacture of Fenestra steel windows, doors and partitions, are of solid, open hearth steel, hot rolled to special Fenestra designs. All such bars are rolled with heavy fillets in all reentrant angles. These fillets increase the strength and rigidity of the bars, making them much stronger than similar sections of pressed metal.

(12) Protection of Hardware

We strongly recommend that hardware be stored carefully in the original packages and that it be attached *only* after the windows, doors or partitions have been erected, glazed and painted.

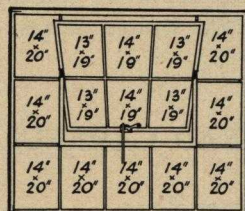
(13) Galvanizing

Where specified at the time the order is taken, Fenestra Architectural and Industrial Windows can be supplied, hot galvanized. (Certain parts, such as glazing angles and side arms, electro-plated.) Mechanical operators may also be secured, galvanized, under the same conditions with the exception of powers which are painted with aluminum paint.



Bed Puttying

Inserting Glazing Clips



DEPARTMENT OF ENGINEERING RESEARCH

Predetermining Daylight and Airation of Buildings

Due to the importance of adequate light and ventilation in the modern industrial building, increased attention is being given to the fenestration or window layout, thereby utilizing the forces of nature and cutting down the cost of apparatus which would otherwise be necessary to furnish artificial light or forced ventilation.

The daylighting characteristics of a building under various conditions can be predetermined by methods of proved accuracy, and the amount and distribution of the natural illumination can be adjusted to a remarkable degree.

As the oldest and largest manufacturers of steel windows in the United States, we have been consulted by architects and engineers for many years about their problems in Daylighting and Airation (natural ventilation).

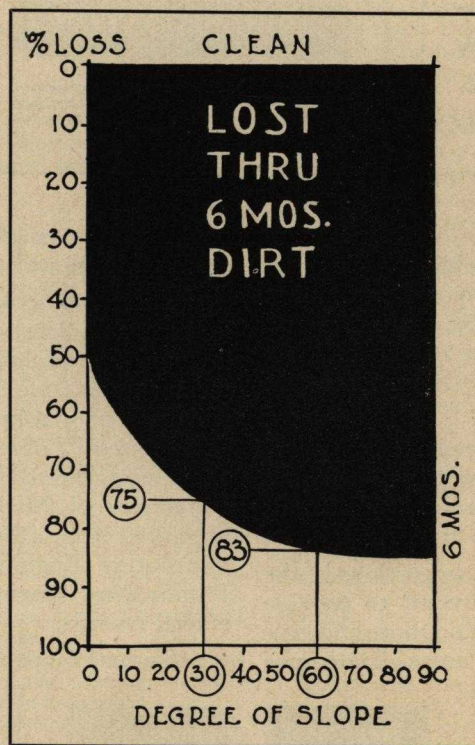
About seven years ago the Department of Engineering Research was formed to ascertain what natural laws governed the distribution of daylight through windows; what effect the location of the windows (in sidewall, monitor, etc.), or the position of the window (vertical, at a slope, or practically horizontal as in skylights) has upon the amount of daylight and its distribution.

It was discovered that the most serious detriment to proper daylighting in industrial buildings is the dirt



Fenestra

which collects on the windows. Windows in industrial buildings are always dirty. They are seldom, if ever, washed oftener than twice a year. Analysis disclosed that six months' dirt accumulation prevents about 50% of the natural daylight from passing through a vertical window, 75% from passing through a window on a 30° slope and 83% from passing through a window on a 60° slope. The accompanying chart illustrates this graphically.

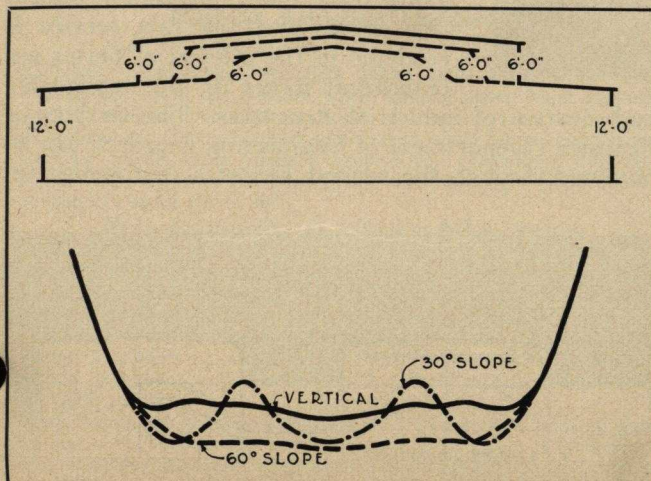


For satisfactory working conditions the even distribution of daylight is fully as important as the amount of daylight. Improper location or position of the windows may result in too great a contrast in the relative intensity of the light resulting in eyestrain and unsafe working conditions. Among the many factors considered by our research engineers are: height of windows in the sidewall of the building; height of the windows in the monitor; the location and width of the monitor; the angle of slope of monitor windows.

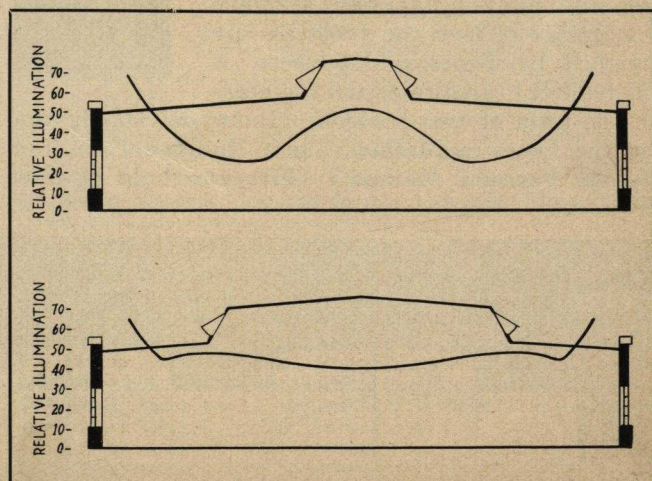
Through many years of study and numerous experiments both in the laboratory and in the field, tables have been prepared by means of which plans can be analyzed and the daylighting characteristics of any window layout can be determined in

advance of actual construction.

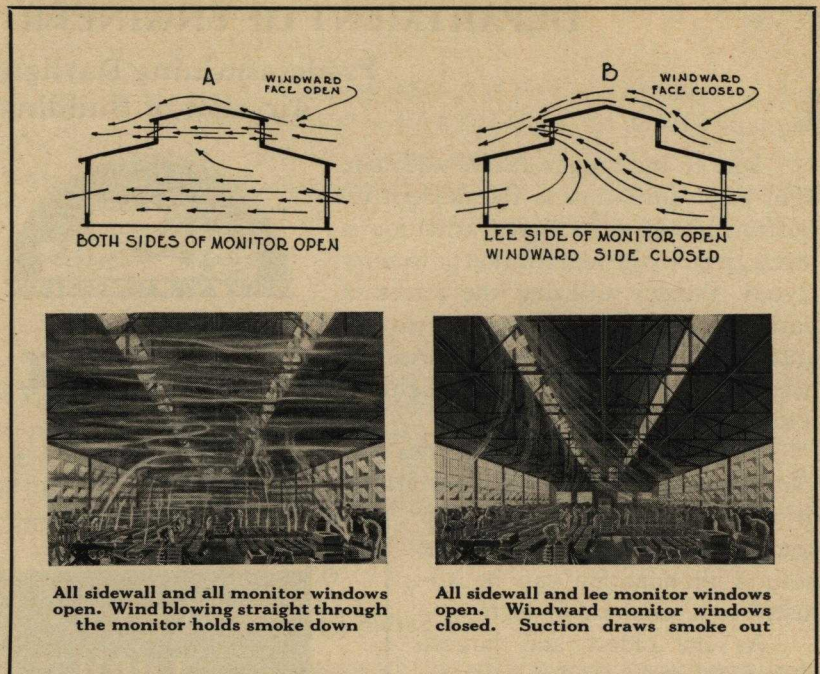
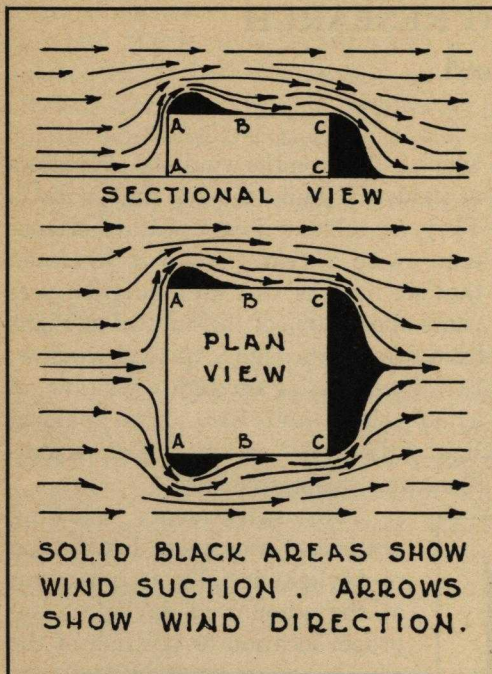
Fenestra Research Engineers in making a study



How light distribution is affected by slope of windows



How light distribution is affected by width of monitors



of ventilation found that a number of factors controlled the aeration of individual buildings. Some of these factors are: the size and location of the windows; the temperature difference between the air inside and outside the building; the orientation of the building with regard to the prevailing wind; the height and location of the monitors or saw-teeth.

The natural forces to be coördinated and controlled to obtain satisfactory aeration are: the prevailing wind and the flow due to temperature difference. (Warm air has a tendency to ascend and cold air to descend.)

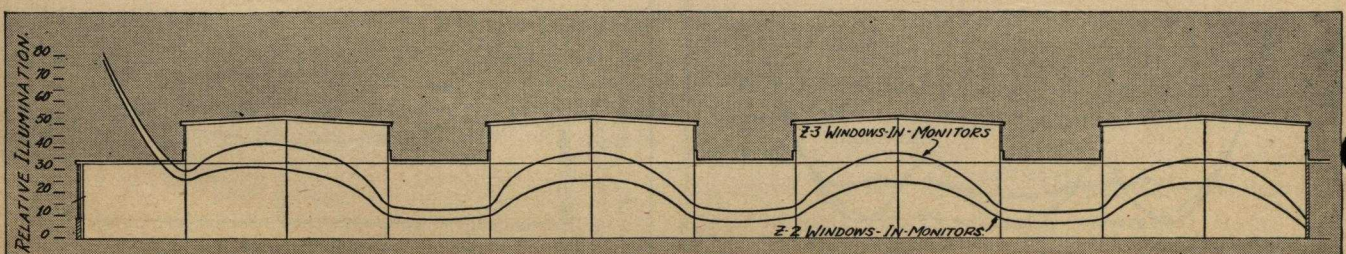
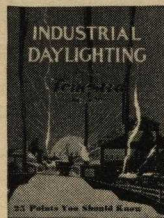
Frequently it is possible to make suggestions in the design of the fenestration (window layout) to provide better distribution of the daylighting and more effective aeration without changing the window areas. Sometimes the results can be obtained with even more economical construction than is called for in the original design.

A non-technical presentation of the main principles of both daylighting and aeration, as well as some conception of how the problems are handled by Fenestra Engineers, is offered free to architects and engineers in the form of two booklets, "Industrial Daylighting by the Fenestra Method," and "Industrial Aeration by the Fenestra Method." Either or both of these

booklets may be obtained from the nearest Fenestra representative or by writing direct to the Home Office.

These two booklets cover the fundamentals of Daylighting and Aeration and are written largely for the layman. For architects and engineers who prefer more technical data, we have a number of pamphlets which will be sent gladly on request. The pamphlets show detailed results obtained by our Research Engineers and the Department of Engineering Research at the University of Michigan. Many of them have been presented before the American Society of Heating and Ventilating Engineers and the American Society of Illuminating Engineers, and made a part of their official records.

On major operations where the type and character of fenestration play an important part in the design of the building, we shall be glad to consider the special problems involved and give any architect or engineer the benefit of our research along these lines. No cost or obligation is involved as this service is rendered in the interest of better use of natural forces in the daylighting and aeration of industrial structures. The services of Fenestra's Department of Engineering Research can be obtained through the nearest Fenestra representative.



Curves Show How Addition of One Pane to Height of Monitor Windows Affects Relative Intensity and Distribution

(GB) ARCHITECTURAL PROJECTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(GB-1) Work Included

Note: List and locate. (See Paragraph 10 Fenestra Page 2).

(GB-2) General

Architectural Projected Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(GB-3) Materials

(GB-3a) **Window Sections**—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in entrant angles.

(GB-3b) **Frame Members**—All frame members shall be unequal leg channel sections, outside leg $1\frac{5}{8}$ ", inside leg $\frac{7}{8}$ ".

(GB-3c) **Muntins**—Muntins shall be $1\frac{3}{8}$ " deep.

(GB-3d) **Vertical Mullions**—Vertical Mullions shall be standard *Fenestra*, hot rolled, solid steel T bars.

Note: Use where two or more windows are placed side by side in the same opening.

(GB-3e) **Horizontal Mullions**—Horizontal mullions shall be standard *Fenestra* (hot rolled, solid steel Z bars and angles) (structural angles and channels).

Note: Specify type. Use where two or more windows are placed one above another in the same opening.

(GB-3f) **Mullion Covers**—(Vertical) (Horizontal) Mullion covers shall be of pressed steel designed to neatly cover mullion recesses.

(GB-4) Construction

(GB-4a) **Frames and Ventilators**—Frames and ventilators shall be mortise and tenon, air hammer riveted and electrically welded at all corners. All exposed faces at welds shall be ground to a smooth finish. Provide continuous two point, flat-contact weathering between ventilators and frames.

(GB-4b) **Muntins**—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase the rigidity and strength at the intersections. Joints at frames shall be mortise and tenon, air hammer riveted.

Note: Intersections of muntins are made as illustrated on Fenestra Page 40. An exclusive Fenestra feature.

(GB-4c) **Glazing Angles**—All glass shall be secured with glazing angles neatly mitered at corners. Angles shall be secured to head, jamb and sill frame and ventilator members with brass tap screws and to muntins with brass barrel screws.

(GB-4d) **Vertical Mullions**—Where two or more windows are placed side by side in the same opening, provide vertical mullions with bolts for frame attachment.

(GB-4e) **Horizontal Mullions**—Where two or more windows are placed one above another in the same opening, provide horizontal mullions with bolts for frame attachment.

(GB-4f) **Mullion Covers**—Provide (vertical) (horizontal) steel mullion covers with the necessary clips and bolts for attachment.

(GB-4g) **Sill and Jamb Anchor Clips**—Furnish steel (sill) (jamb) anchor clips with bolts to attach to frame as required.

(GB-5) Attached Hardware

Note: Attached at Factory.

(GB-5a) **Ventilator Operating Hardware**—Ventilators shall (swing-out from the bottom while sliding down from the top) (or) (swing-in from the top while sliding up from the bottom) as indicated. The *open-out* ventilators shall be so constructed that by tilting them slightly beyond the horizontal they may be conveniently washed from inside the building. (The *open-in* ventilators shall tilt to 90°.)

Note: Specify swing-out, swing-in or both as required.

Each ventilator shall be accurately balanced on two supporting arms of solid spring steel attached to the ventilator with bronze shoulder pivots, equipped with bronze washers. Connections between supporting arms and window frame shall be made by malleable iron brackets rigidly supported on the horizontal frame members or muntins and double riveted to the vertical frame members or muntins with arms attached by bronze shoulder pivots.

Each ventilator shall be equipped with two bronze friction shoes sliding vertically in the ventilator jambs to guide the ventilator and prevent rattling. Friction shoes shall be channel shaped (to insure ease of operation) and mounted on bronze shouldered studs, so constructed that through galvanized compression springs (covered by weather protecting bronze tubes) uniform tension is secured. Shoes shall be accurately gauged and located and solidly riveted in place to assure proper, constant pressure at the jambs.

(GB-5b) **Alignment Springs**—Each *open-out* ventilator shall be equipped with two shouldered, alignment-control bronze springs riveted to the channel jambs.

Note: The shoulders of these springs are so designed and located as to limit the downward travel of the friction shoes and stop all open ventilators in uniform alignment of approximately 60 degrees. When it is desired to open the ventilator at a greater angle or reverse for washing, light pressure on the springs depresses the shoulders and allows the friction shoes to slide past. As the ventilator is returned to a closed position, the action of the spring is automatic. See Fenestra Page 6.

Note: Include if open-out ventilators are used.

(GB-5c) **Alignment Stops**—Each *open-in* ventilator shall be equipped with a solid steel stop which prevents its opening farther than 90°.

Note: Include if open-in ventilators are used.

(GB-5d) **Cam Handle Brackets**—Where required, provide special design malleable iron brackets, triple riveted to ventilators, for attachment of cam handles.

(GB-6) Detached Hardware

Note: See Fenestra Page 6.

(GB-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

(GB-6b) All hardware for Architectural Projected Windows shall be of bronze, oxidized bronze finish.

(GB-6c) **Locking and Operating Devices**

Note: Select as required.

Note: Where ventilators are screened, special flat-type bronze handles may be secured which will permit the screen to be set 1" from the face of the window instead of 2" necessary with standard cam handles. Specify if desired.

(1) *For open-out ventilators within reach from floor*—Bronze cam handle, Part 114, attached to malleable iron bracket by bronze screw-head bolt through steel spring friction clevis. Bronze strike plate carrying a 6" bronze hook stay, Part 122, riveted to window at ventilator sill.

(2) *For open-out ventilators beyond reach from floor*—Riveted bronze pole ring, Part 151, at head of ventilator. Bronze cam handle, Part 150, with hole for pole hook, attached to malleable iron brackets by bronze, screw-head, steel, spring, friction clevis. Riveted bronze strike plate.

(3) *For open-in ventilators within reach from floor*—Riveted bronze spring latch with ornamental handle, Part 212, at head of ventilator. Riveted bronze lipped strike.

(4) *For open-in ventilators beyond reach from floor*—(Riveted bronze spring latch with pole hook ring handle, Part 147, at head of ventilator; riveted steel strike). (Riveted bronze spring latch with endless chain, Part 146, at head of ventilator. Riveted steel strike. Riveted bronze chain guide, Part 149, at sill).

Note: Select type desired.

(GB-7) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed. (See Paragraph 7, Fenestra Page 1.)

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(GB-7a) All Architectural Projected Windows shall be erected in prepared openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See paragraph 3 Fenestra Page 1.

(GB-7b) All windows shall be set plumb and true, properly aligned and securely anchored before glazing. Standard *Fenestra* sill anchors shall be used under the following conditions:

(1) In all cases where a ventilator comes at the sill of the window, regardless of the window width.

(2) In all cases where the window is over 5' 0" wide, regardless of the location of the ventilators.

(3) In all multiple unit openings where mullions are not anchored into the sills.

All ventilators shall be properly adjusted before glazing.

(Continued on Fenestra Page 24)

(GB-7c) Apply all hardware in accordance with the manufacturer's directions. Detached hardware shall not be installed until after glazing and painting has been completed.

(GB-8) Painting

All Windows shall be given one dip-coat of red mineral paint by the Manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 3, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required so specify here, including specification for paint and its application.

(GB-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 8 Fenestra Page 2.

(GB-9a) Glass—Glass shall be (1/4" thick plate) (1/4" wire of type desired) (double strength).

Note: 1/4" thick glass is recommended. Single strength glass is not recommended.

(GB-9b) Putty—Putty shall be a high grade steel window putty.

Note: Ordinary wood sash putty must not be used. See paragraph 9, Fenestra Page 2.

(GB-9c) Glazing—All Architectural Projected Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured with glazing angles set against face putty neatly and smoothly applied.

Note: Do not paint until putty has thoroughly hardened. See note paragraph (GB-8).

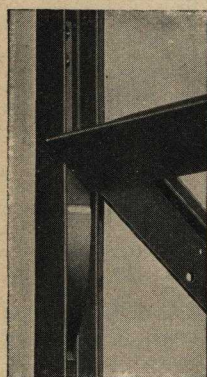


Fig. 1

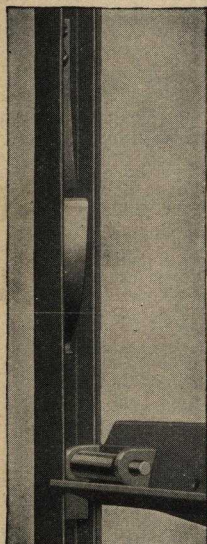
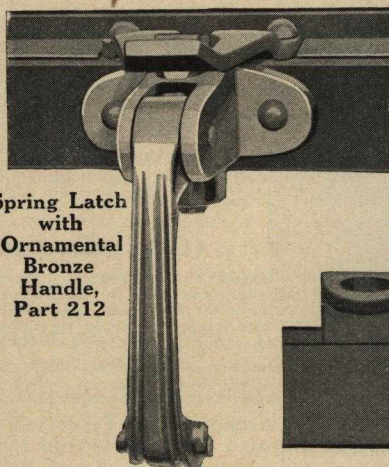


Fig. 2



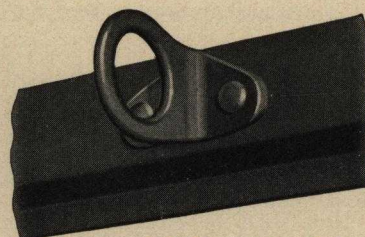
Bronze Spring Latch with Chain, Part 146

Figs. 1 and 2 show views of the alignment stop. Fig. 1, ventilator against the stop. Fig. 2, ventilator below the stop.

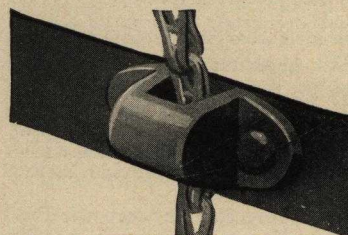


Spring Latch with Ornamental Bronze Handle, Part 212

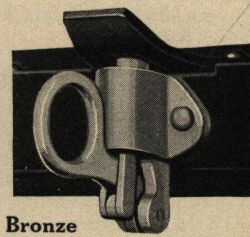
Ornamental Bronze Cam Handle, Part 114, Strike and Stay, Part 122



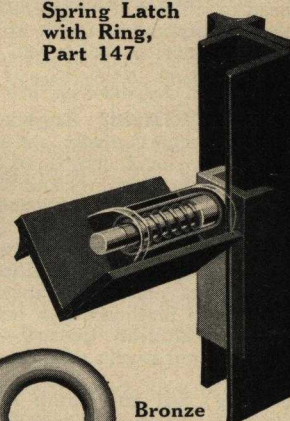
Bronze Pole Ring, Part 151



Bronze Chain Guide, Part 149



Bronze Spring Latch with Ring, Part 147



Bronze Sliding Friction Shoe



Bronze Cam Handle, Part 150, and Strike

Supporting Arm and Bracket



Architectural Projected Window Hardware

(GB-10) Provision for Screens

Note: Fenestra Page 10 gives suggestions for screening provisions. Include in the Carpentry Specifications the necessary clauses covering wood trim required in conjunction with screens. Space between inside screen and window must be not less than 2" to clear standard hardware. If special "Flat Type" handles are specified. (See note, paragraph [GB-6c] 1" clearance only is required.) On account of the roller, rolling screens require a 2 1/2" clearance.

(GB-11) Screens

Note: On open-out ventilators, metal side hinged or vertical sliding screens may be used as desired. Rolling screens up to 6' 0" wide may be used where entire window is covered. On open-in ventilators, metal, removable, fixed, outside screens may be used. Screens are not included by the Window Manufacturer and should, therefore, be provided for under another division of the specification.

(GB-12) Shading

Note: All shades must be located at least 2" from the inside face of the window for hardware clearance. Clearance for screens depends upon the type selected.

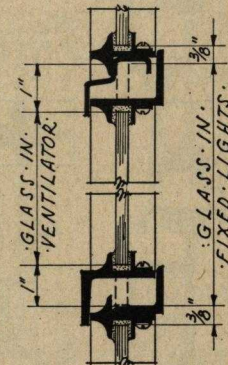
Note: Shade bracket clips designed to attach by drilling and tapping two small holes at the top of each jamb section are supplied at slight added cost (see Fenestra Page 10). These clips are of sufficient depth to bring the shade bracket in the proper position and are slotted to accommodate any standard shade bracket. Shade clips cannot be used satisfactorily with rolling screens but shade brackets may be attached to the underside of screen box. Brackets of various projections may be used to clear any type of screening except where whole opening is screened. If shade bracket clips are required, so specify.

STANDARD TYPES AND SIZES

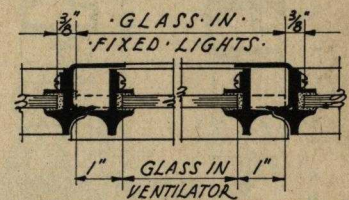
GLASS SIZES 3'-0" 34" 22" 3046	3'-6" 22" 8 5/8" 3646	4'-0" 28" 8 5/8" 4046	4'-6" 34" 8 5/8" 4646	5'-0" 34" 11 5/8" 5046
4'-6" 28" 12" 3050	3650	4050	4650	5050
5'-0" 28" 15" 3056	3656	4056	4656	5056
5'-6" 28" 18" 3060	3660	4060	4660	5060
6'-0" 22" 12" 3066	3666	4066	4666	5066
6'-6" 22" 15" 3070	3670	4070	4670	5070
7'-0" 28" 12" 3076	3676	4076	4676	5076
7'-6" 28" 15" 3080	3680	4080	4680	5080
8'-0" 28" 18" 3086	3686	4086	4686	5086
8'-6" 22" 22" 15" 3090	3690	4090	4690	5090
9'-0" 32"	20"	26"	32"	GLASS SIZES

DIMENSIONS SHOWN ARE WINDOW & OPENING SIZES FOR SINGLE UNITS. TWO OR MORE UNITS MAY BE COMBINED IN AN OPENING BY MEANS OF MULLIONS.

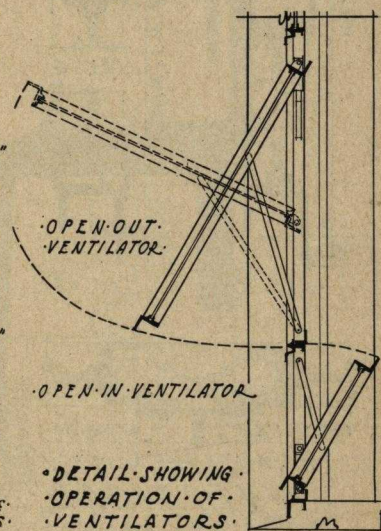
GLASS SIZES SHOWN ABOVE AND TO THE RIGHT OF TYPES ARE FOR FIXED LIGHTS. THOSE SHOWN BELOW AND TO THE LEFT OF TYPES ARE FOR VENTILATORS ONLY. SECTIONS BELOW SHOW RELATION OF GLASS IN FIXED AND VENTILATOR LIGHTS.

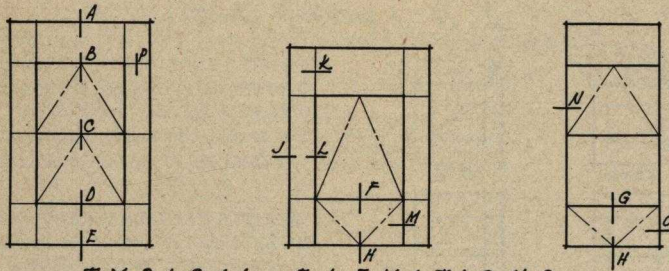


• VERTICAL SECTION •



• HORIZONTAL SECTION •

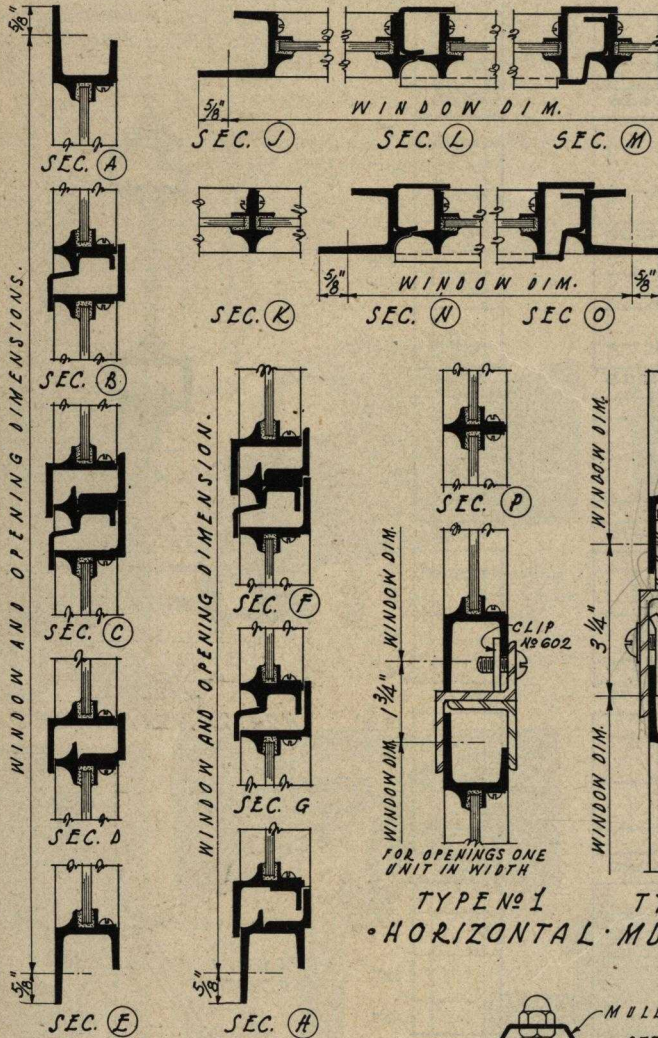




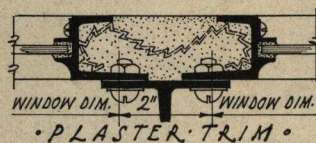
• TYPICAL ELEVATIONS •

SYMMETRICAL COMBINED UNITS			
WIDTH OF OPENING FT.-IN.	UNITS WIDE	LIGHTS WIDE	ARRANGEMENT OF UNITS IN OPENING (LETTER M INDICATES MULLION)
6'-2"	2	2	3'-0"-M-3'-0"
7'-2"	2	6	3'-6"-M-3'-6"
8'-2"	2	6	4'-0"-M-4'-0"
9'-2"	2	6	4'-6"-M-4'-6"
9'-4"	3	3	3'-0"-M-3'-0"-M-3'-0"
9'-10"	3	5	3'-0"-M-3'-6"-M-3'-0"
10'-2"	2	6	5'-0"-M-5'-0"
10'-4"	3	5	3'-0"-M-4'-0"-M-3'-0"
10'-10"	3	7	3'-6"-M-3'-0"-M-3'-6"
10'-10"	3	5	3'-0"-M-4'-6"-M-3'-0"
10'-10"	3	9	3'-6"-M-3'-6"-M-3'-6"
11'-4"	3	5	3'-0"-M-5'-0"-M-3'-0"
11'-4"	3	7	4'-0"-M-3'-0"-M-4'-0"
11'-4"	3	9	3'-6"-M-4'-0"-M-3'-6"
11'-10"	3	9	3'-6"-M-4'-6"-M-3'-6"
11'-10"	3	9	4'-0"-M-3'-6"-M-4'-0"
12'-4"	3	7	4'-6"-M-3'-0"-M-4'-6"
12'-4"	3	9	4'-0"-M-4'-0"-M-4'-0"
12'-4"	3	9	3'-6"-M-5'-0"-M-3'-6"

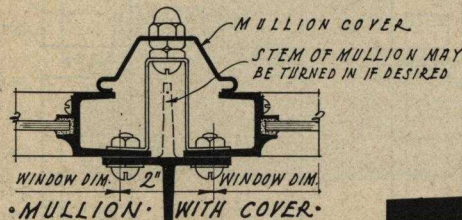
USE THESE DIMENSIONS WITH ANY HEIGHT DIMENSION



TYPE No 1 TYPE No 2
• HORIZONTAL MULLIONS •



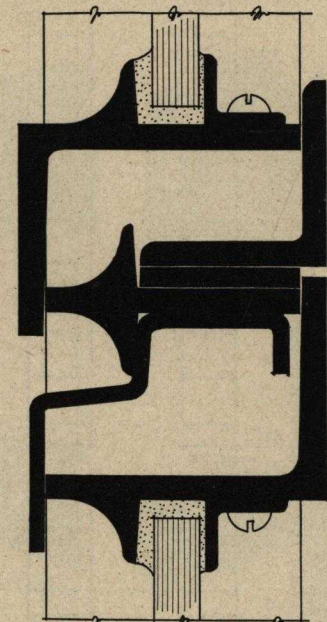
• PLASTER TRIM •



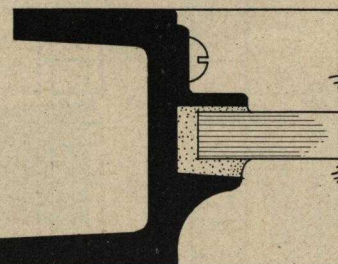
• MULLION WITH COVER •

• VERTICAL MULLIONS •

• SCALE : 3" = 1'-0" •

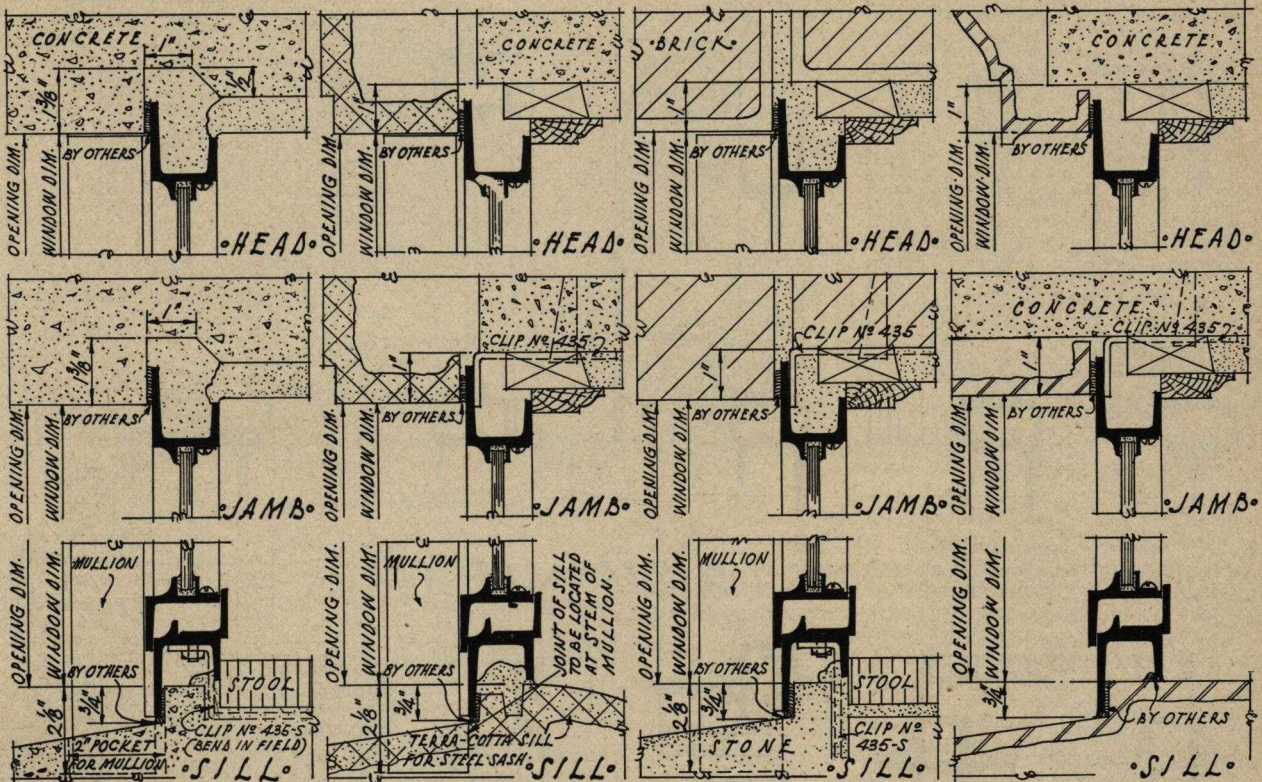


• FULL-SIZE DETAIL
• OF MEETING RAIL •

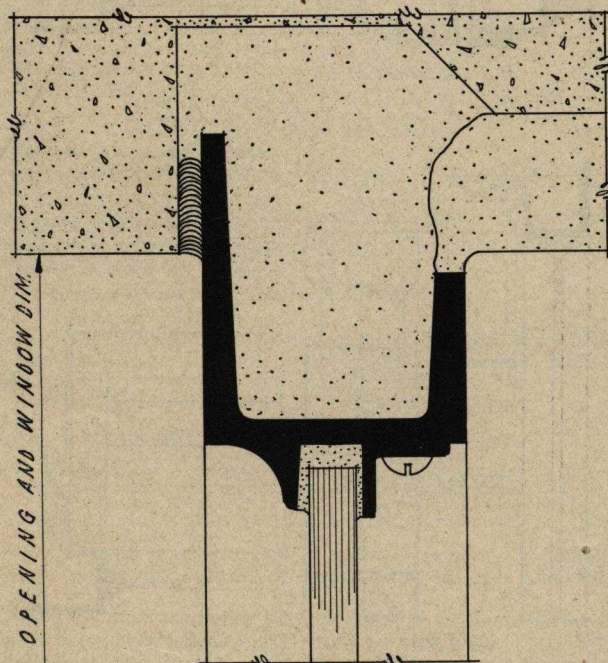


• FULL-SIZE JAMB DETAIL •

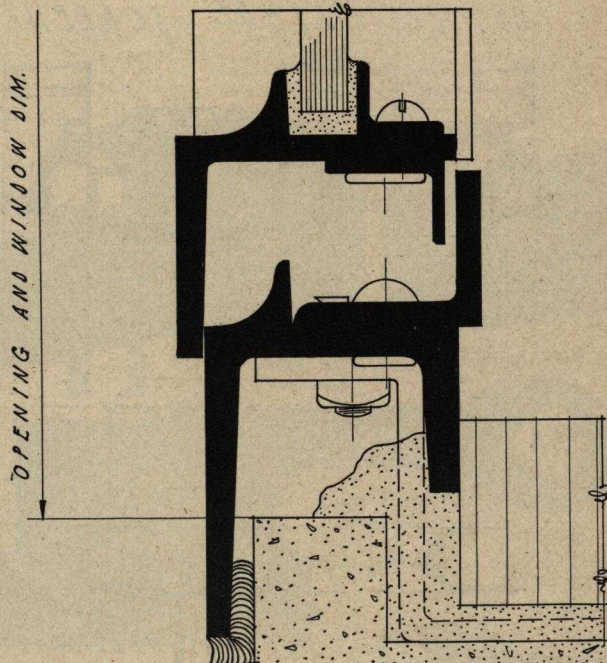
• CONCRETE • CONSTR. • TERRA-COTTA • • SOLID • BRICK • • ORNAMENTAL • IRON •



SCALE: 3"=1'-0"



• FULL-SIZE HEAD DETAIL •

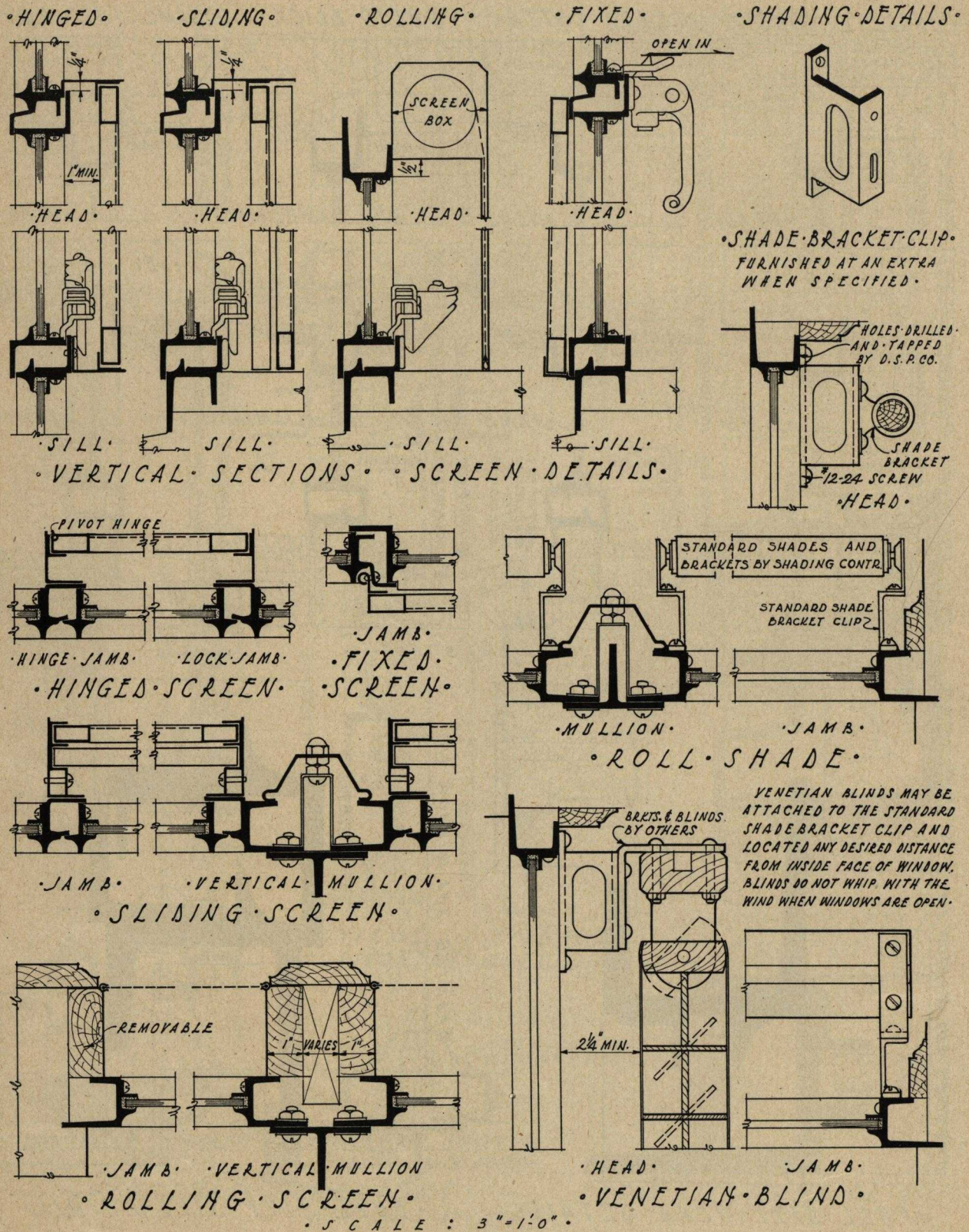


• FULL-SIZE SILL DETAIL •

Fenestra
August 1929

*Architectural Projected Windows
Installation Details*

Plate No
G-203



(GC) COMMERCIAL PROJECTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: Commercial Projected Windows are in general design and operation similar to Architectural Projected Windows. They are made to meet the demand for a less expensive window of this type. The chief differences between the two are (1) the section of the frame member; (2) the addition of muntins dividing the window into small panes; (3) inside putty instead of glazing angles; (4) use of malleable iron instead of bronze hardware.

Note: Commercial Projected Windows with "open-in" ventilators are particularly adapted to Food Products Plants since these windows may be screened economically. See Paragraphs (GC-10) and (GC-11).

Note: To avoid repetition where the specification is the same as that for the Architectural Projected Windows, this is so noted. Where not identical, use the clauses here given. For Specification for Architectural Projected Window referred to, see Fenestra Page 5.

(GC-1) Work Included

Same as (GB-1).

(GC-2) General

Commercial Projected Windows shall be Fenestra as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(GC-3) Materials

(GC-3a) Window Sections—Same as (GB-3a).

(GC-3b) Frame Members—All frame members shall be (special angle sections with protruding leg 1" deep) (special unequal leg channel sections).

Note: Select as required unequal leg channel at added cost over angle section.

(GC-3c) Muntins—Same as (GB-3c).

(GC-3d) Vertical Mullions—Same as (GB-3d).

(GC-3e) Horizontal Mullions—Horizontal mullions shall be standard Fenestra (hot rolled solid steel T bars) (Structural angles and channels).

Note: Specify type. Use where two or more windows are placed one above another in the same opening.

(GC-3f) Mullion Covers—Same as (GB-3f).

(GC-4) Construction

(GC-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted at all corners. Ventilators shall, in addition to riveting, be electrically welded at corners, with exposed faces ground to a smooth finish.

(GC-4b) Muntins—Same as (GB-4b).

(GC-4c) Vertical Mullions—Same as (GB-4d).

(GC-4d) Horizontal Mullions—Same as (GB-4e).

(GC-4e) Mullion Covers—Same as (GB-4f).

(GC-4f) Sill and Jamb Anchor Clips—Same as (GB-4g).

(GC-5) Attached Hardware

Note: Attached at factory.

(GC-5a) Ventilator Operating Hardware—Same as (GB-5b) (GB-5c).

(GC-5d) Cam Handle Brackets—Where required, provide solid rolled steel Z bar brackets, triple riveted to the ventilators, for the attachment of cam handles.

(GC-6) Detached Hardware

(GC-6a) Same as (GB-6a).

(GC-6b) All hardware for Commercial Projected Windows shall be (malleable iron with one coat of red mineral paint) (bronze, oxidized bronze finish).

Note: Select as required. Bronze at added cost over iron.

(GC-6d) Locking and Operating Devices—

Note: Select as required.

Note: Where ventilators are screened, special flat type handles may be secured at added cost which will permit the screen to be set 1" from the face of the window instead of 2" necessary with standard cam handles. Specify if desired.

(1) For open-out ventilators within reach from floor—Malleable iron cam handle attached to Z bar bracket by bolt and nut, Part 150.

(2) For open-out ventilators beyond reach from floor—Riveted malleable iron pole hook ring at head of ventilator, Part 151, malleable iron cam handle, Part 150, with hole for pole hook, attached to Z bar bracket by bolt and nut.

(3) For open-in ventilators within reach from floor—Riveted malleable iron spring latch with finger ring handle at head of ventilator, Part 147.

(4) For open-in ventilators beyond reach from floor—(Riveted malleable iron spring latch with endless chain, Part 146, at head of ventilator. Riveted iron chain guide, Part 149, at sill) (or) (Riveted malleable iron spring latch with pole hook ring handle, Part 147, at head).

(GC-7) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in

accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed. See Paragraph 7, Fenestra Page 1.

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(GC-7a) All Commercial Projected Windows shall be erected in prepared openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See Paragraph 3, Fenestra Page 1.

(GC-7b) Same as (GB-7b).

(GC-7c) Same as (GB-7c).

(GC-8) Painting

Same as (GB-8).

(GC-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 8, Fenestra Page 2.

(GC-9a) Glass—Same as (GB-9a).

(GC-9b) Putty—Same as (GB-9b).

(GC-9c) Glazing—All Commercial Projected Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring, glazing clips furnished by the window manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Glazing angles are obtainable at slight added cost.

Note: Do not paint until putty has thoroughly hardened. See note Paragraph (GB-8).

(GC-10) Provision for Screens

(GC-10a) For Open-out Ventilators—Same as (GB-10).

(GC-10b) For Open-in Ventilators—For open-in ventilators provide permanent brackets for removable screen support.

Note: See Fenestra Page 31.

(GC-11) Screens

Same as (GB-11).

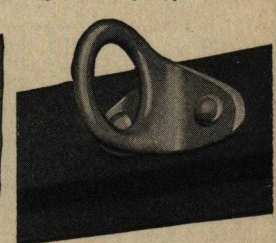
Note: Where desired for open-in ventilators, the Window Manufacturer will furnish, at reasonable added cost, removable, tubular, steel frame, rewirable screens (baked enameled finish) with No. 16 mesh bronze screen cloth. These screens are well constructed and furnished completely adapted to and fitting the ventilator opening. (See Fenestra Page 15.) If required so specify.

(GC-12) Shading

Note: Where ventilators are "open out" shade bracket clips, slotted to accommodate standard shade brackets, may be attached by drilling and tapping two small holes at the top of each jamb section of the frame. Clips are supplied at slight added cost. If required so specify.



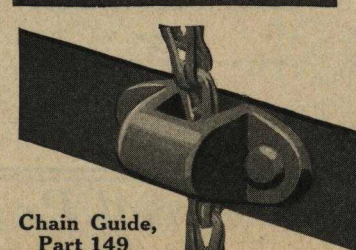
Spring Latch with Chain, Part 146



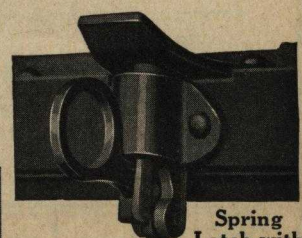
Pole Ring, Part 151



Cam Handle, Part 150



Chain Guide, Part 149

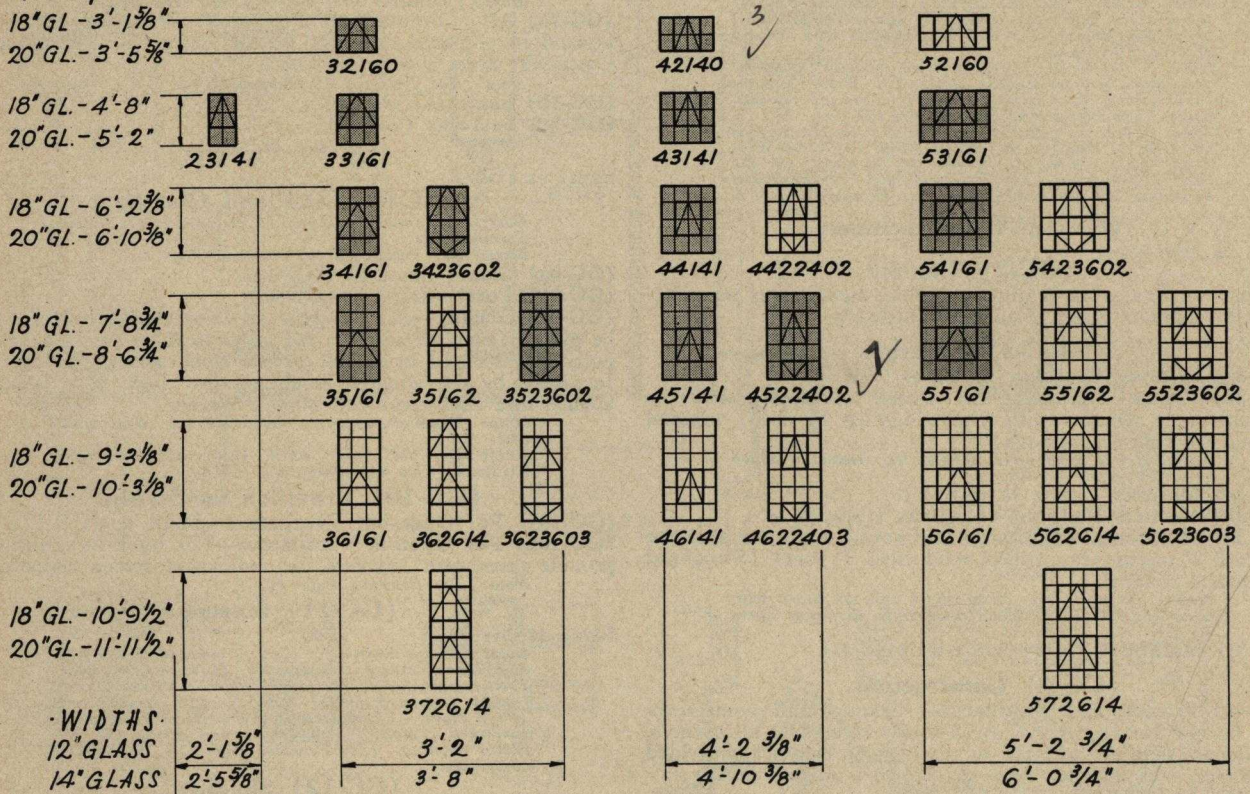


Spring Latch with Ring, Part 147

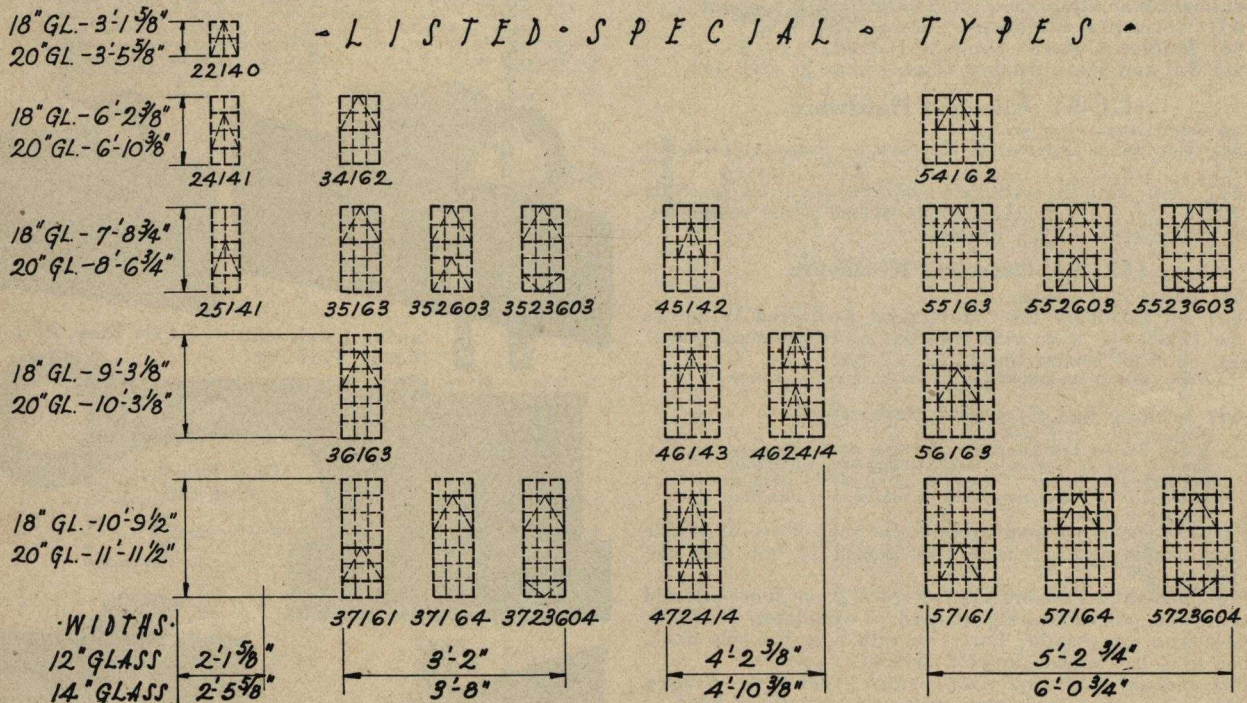
Commercial Projected Window Hardware

• S T A N D A R D - T Y P E S •

• HEIGHTS •



- L I S T E D - S P E C I A L - T Y P E S -



Fenestra
August 1929

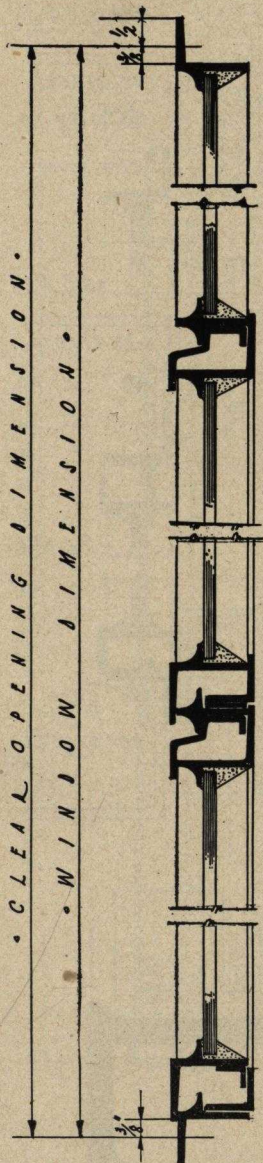
*Commercial Projected Windows
Types and Sizes*

Plate No
G-301

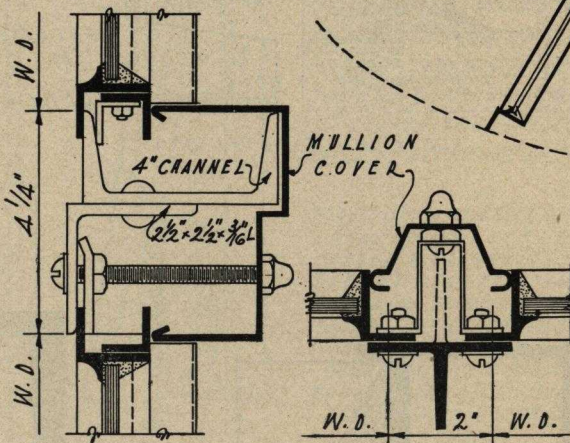
Symmetrical Combined Widths

12" x 18" Glass	14" x 20" Glass	Units Wide	Lights Wide	No. of Units and Lights Per Unit
2' 1 1/8"	2' 5 5/8"	1	2	2
3' 2"	3' 8"	1	3	3
4' 2 3/8"	4' 10 3/8"	1	4	4
4' 5 1/4"	5' 1 1/4"	2	4	2, 2
5' 2 3/4"	6' 0 3/4"	1	5	5
6' 6"	7' 6"	2	6	3, 3
8' 6 3/4"	9' 10 3/4"	2	8	4, 4
9' 10"	11' 4"	3	9	3, 3, 3
10' 7 1/2"	12' 3 1/2"	2	10	5, 5
10' 10 3/8"	12' 6 3/8"	3	10	3, 4, 3
11' 10 3/4"	13' 8 3/4"	3	11	3, 5, 3
12' 11 1/8"	14' 11 1/8"	3	12	4, 4, 4
13' 11 1/2"	16' 1 1/2"	3	13	4, 5, 4
13' 11 1/2"	16' 1 1/2"	3	13	5, 3, 5
14' 11 1/8"	17' 3 1/8"	3	14	5, 4, 5
15' 2 3/4"	17' 6 3/4"	4	14	3, 4, 4, 3
16' 0 1/4"	18' 6 1/4"	3	15	5, 5, 5
17' 3 1/2"	19' 11 1/2"	4	16	4, 4, 4, 4
19' 4 1/4"	22' 4 1/4"	4	18	4, 5, 5, 4
20' 7 1/2"	23' 9 1/2"	5	19	5, 3, 3, 3, 5
21' 5"	24' 9"	4	20	5, 5, 5, 5

COMBINE WIDTH DIMENSIONS IN COL. 1 WITH 12" x 18" GLASS HEIGHTS ONLY.
COMBINE WIDTH DIMENSIONS IN COL. 2 WITH 14" x 20" GLASS HEIGHTS ONLY.

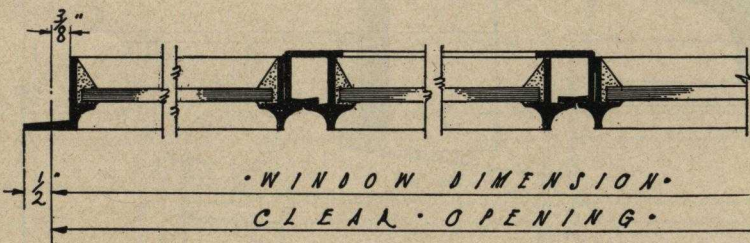


• VERTICAL SECTION •

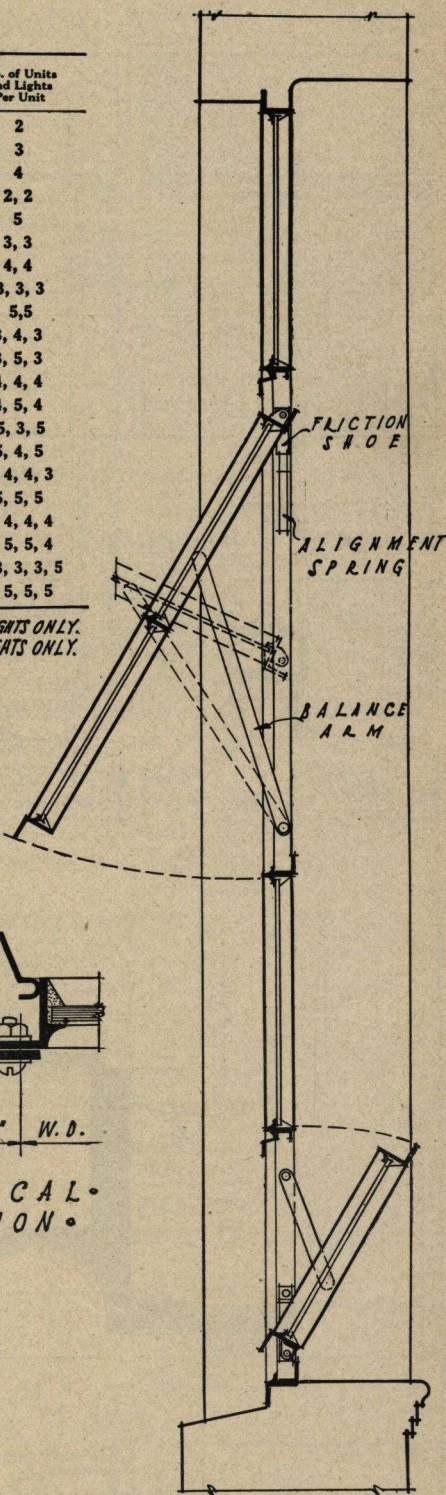


• HORIZONTAL MULLION •

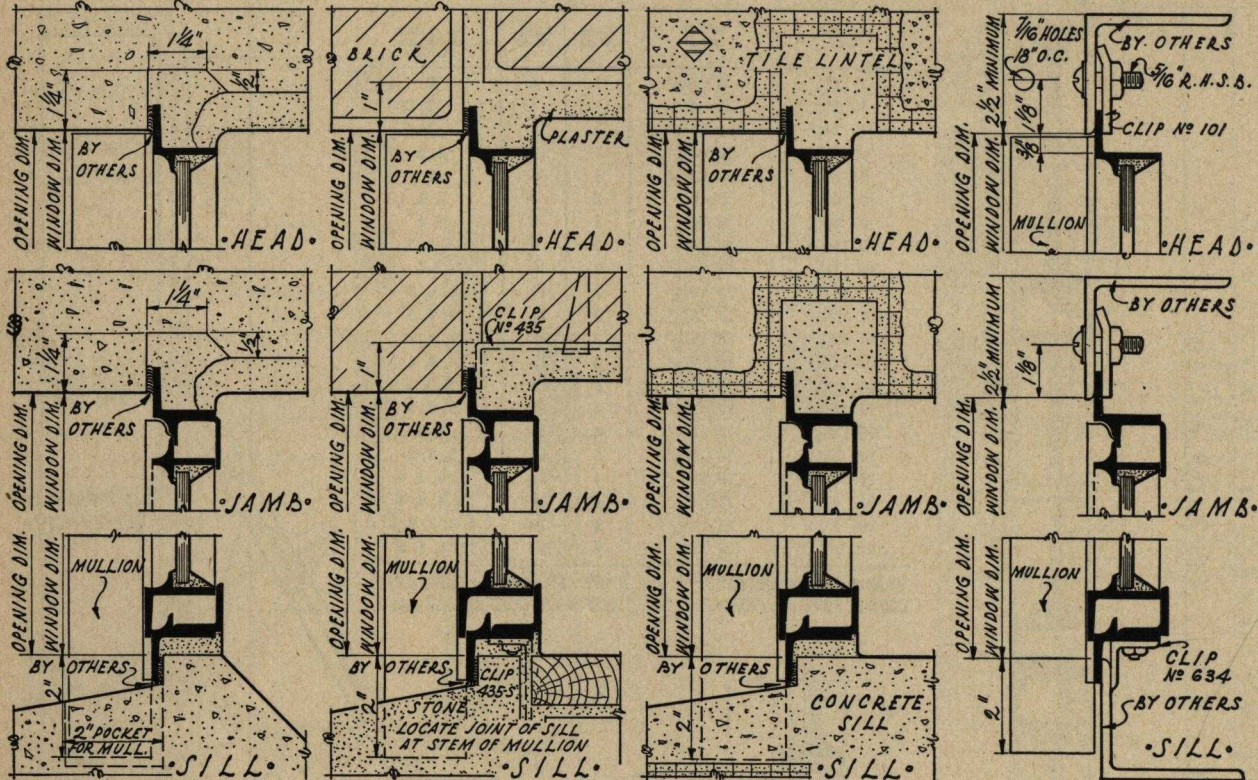
• VERTICAL MULLION •



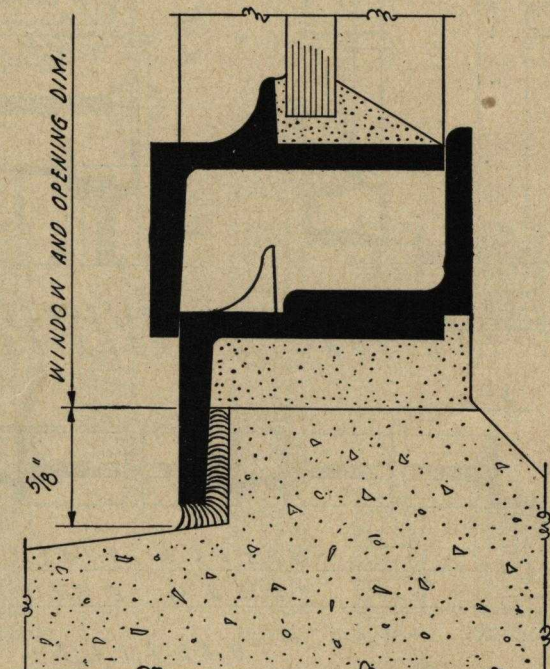
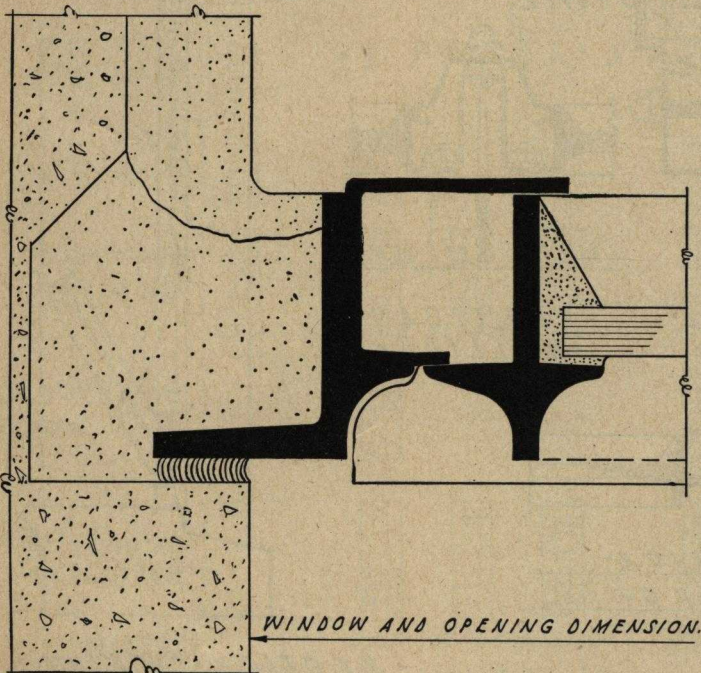
• OUTSIDE •
• HORIZONTAL SECTION •
• SCALE: 3" = 1'-0" •

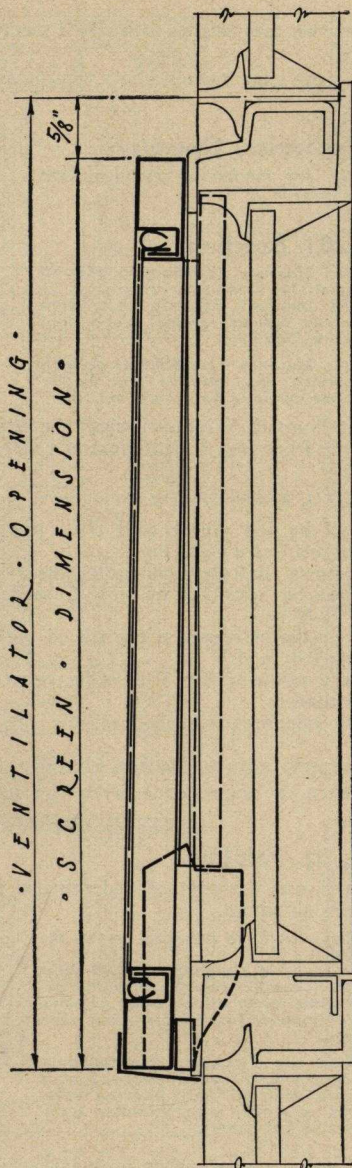


•CAST CONCRETE •SOLID BRICK •TILE CONSTRUCTION •STEEL CONSTR.

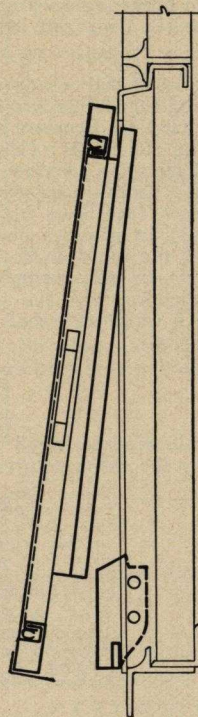


• SCALE: 3" = 1'-0" •

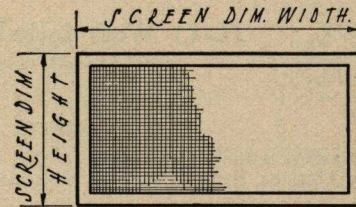




• DETAIL WHEN VENT.
• COMES TO HEAD •



• METHOD OF ATTACHING •
• SCREEN TO WINDOW •



SIZE OF VENT	SIZE OF SCREEN	
	WIDTH	HEIGHT
4 PANE 12x18	23 7/8"	36 1/8"
6 PANE 12x18	36 1/4"	36 1/8"
8 PANE 12x18	48 5/8"	36 1/8"
4 PANE 14x20	27 1/8"	40 1/8"
6 PANE 14x20	42 1/4"	40 1/8"
8 PANE 14x20	56 5/8"	40 1/8"

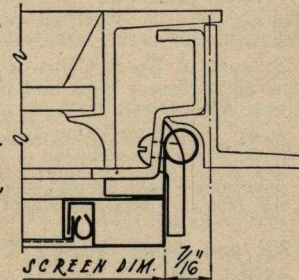
SIZES SHOWN ABOVE ARE STANDARD. ANY SIZE NOT SHOWN IS SPECIAL. SCREEN WIDTH AND HEIGHT CAN BE DETERMINED BY SUBTRACTING DIMENSIONS SHOWN ON SECTIONS FROM THE VENTILATOR OPENING.

SCREEN FRAMES ARE MADE OF OPEN HEARTH STEEL GALVANIZED AND FINISHED IN BLACK BAKED ENAMEL. CLOTH IS OF 16 MESH OXIDIZED BRONZE WIRE AND IS WOVEN FROM #32 GAUGE BRONZE WIRE.

WHEN SCREENING IS SPECIFIED THE WINDOWS ARE PUNCHED IN SHOP TO RECEIVE NECESSARY CLIPS FOR HOLDING SCREENS WHILE SCREENS AND CLIPS ARE SHIPPED DIRECT FROM MANUFACTURER.

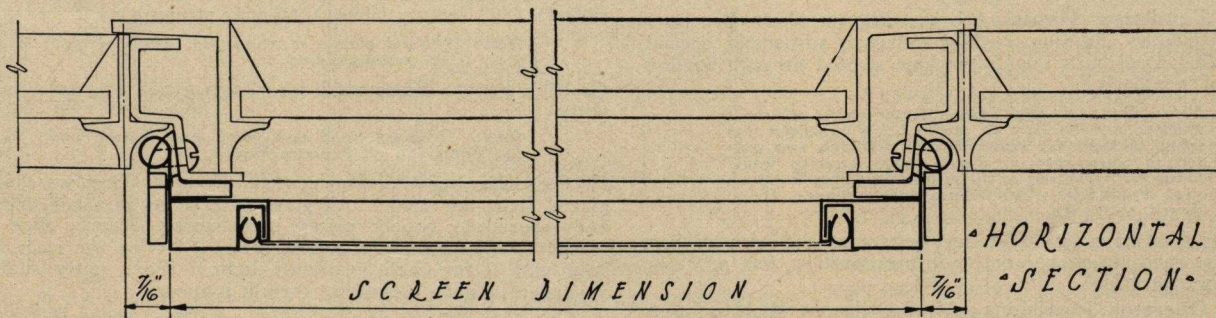
IF SCREENING IS NOT SPECIFIED AND LATER IS DESIRED, IT WILL BE NECESSARY TO DRILL HOLES FOR CLIPS IN FIELD.

FIRST-OPEN VENTILATOR
SLIDE END OF BAFFLE
UNDER WEATHERING.
SECOND-PUSH SCREEN UP
AS FAR AS IT WILL GO.
THIRD-BRING BOTTOM OF
SCREEN FRAME IN TIGHT
AGAINST OUTSIDE OF WINDOW
FOURTH-PUSH SCREEN DOWN
FORCING BAFFLE BACK OF
LUG ON BRACKET.



• DETAIL WHEN SCREEN •
• COMES TO JAMBS •

• VERTICAL SECTION •



• SCALE: HALF-FULL-SIZE •

• HORIZONTAL
• SECTION •

(L) HORIZONTALLY PIVOTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

(L-1) Work Included

Note: List and locate. (See Paragraph 10, Fenestra Page 2.)

(L-2) General

Horizontally Pivoted Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(L-3) Materials

(L-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

(L-3b) Frame Members—All frame members shall be special angle sections.

(L-3c) Muntins—Muntins shall be $1\frac{3}{8}$ " deep.

(L-3d) Vertical Mullions—Vertical mullions shall be standard *Fenestra* hot rolled, solid steel T bars.

Note: Use where two or more windows are placed side by side in the same opening.

(L-3e) Horizontal Mullions—

Note: Horizontal structural mullions are not furnished by the window manufacturer. Include structural steel horizontal mullions in Structural Steel Specifications.

(L-4) Construction

(L-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted, at all corners. Provide continuous two point, flat-contact weathering between ventilators and frames.

(L-4b) Muntins—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase their strength at the point of intersection. Joints at frames shall be mortise and tenon, air hammer riveted.

Note: Intersections of muntins are made as illustrated on Fenestra Page 22. An exclusive Fenestra feature.

(L-4c) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide vertical mullions with bolts for frame attachment.

(L-4d) Structural Steel Clips—Furnish in types adapted to conditions, all necessary clips and bolts for attaching windows to structural steel.

Note: All structural steel is furnished by others. Include in steel specifications all punching to accommodate clips. Where masonry work will interfere with installation of clips at time windows are erected, provide that clip bolts be included and attached by the steel contractor.

(L-4e) Sill and Jamb Anchor Clips—Furnish steel (sill) (jamb) anchor clips with bolts to be attached in the field.

(L-5) Attached Hardware

Note: Attached at factory.

(L-5a) Ventilator Pivots—All ventilators shall be horizontally pivoted and supported by external, adjustable, special, solid rolled, steel butts double machine riveted through window bars and weathering.

Note: Butts are set 2" above center unless otherwise specified. Butts may be set 4" below ventilator top where windows are required to be relatively rain protecting when open or where center pivoting would throw the upper half of the sash in conflict with piping, sway bracing or other interior obstructions. If required, so specify.

All butts shall have $\frac{5}{8}$ " solid steel bolts equipped with washers and nuts; each pin shouldered to insure constant, free and easy ventilator operation.

(L-5b) Operator Provisions—All ventilators shall be provided with solid rolled steel Z bar brackets, triple machine riveted to ventilator sill for attachment of operating hardware.

(L-6) Detached Hardware

Note: See Fenestra Page 22.

(L-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

Note: Select type desired.

(L-6b) Provide malleable iron cam latches and rolled steel stay bars.

(L-6c) Provide malleable iron cam latches, chain, chain catches and pulley brackets.

(L-7) Mechanical Operators

Note: Specifications for mechanical operators are given on Fenestra Pages 31 to 35.

(L-8) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows can be erected in prepared opening. (See Fenestra Page 17.)

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(L-8a) All Horizontally Pivoted Windows shall be erected in preparing openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See Paragraph 3, Fenestra Page 1.

(L-8b) All windows shall be set plumb and true, properly aligned and securely anchored before glazing. Standard *Fenestra* sill anchors shall be used under the following conditions: (Use 2 clips for windows up to 6'-6" wide and 4 clips for windows over 6'-6").

(1) In all cases where a ventilator comes at the sill of the window, regardless of the window width.

(2) In all cases where the window is over 5'-0" wide, regardless of the location of the ventilators.

(3) In all multiple unit openings where mullions are not anchored into the sills.

All ventilators shall be properly adjusted before glazing.

(L-8c) Apply all hardware in accordance with the manufacturer's directions.

(L-9) Painting

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 3, Fenestra Page 1) at a reasonable added cost, will do field painting after erection. If required, so specify here, including specification for paint and its application.

(L-10) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 8, Fenestra Page 2.

(L-10a) Glass—Glass shall be ($\frac{1}{4}$ " rough wire) ($\frac{1}{4}$ " factory ribbed) ($\frac{1}{8}$ " factory ribbed) (double strength).

Note: $\frac{1}{4}$ " thick glass is recommended. Single strength glass is not recommended.

(L-10b) Putty—Putty shall be a high grade of steel window putty.

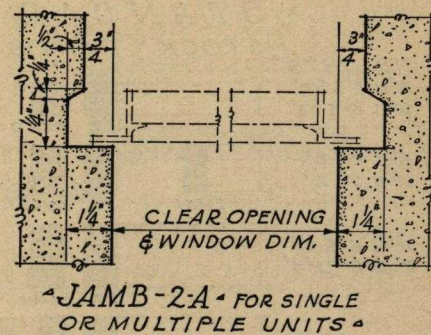
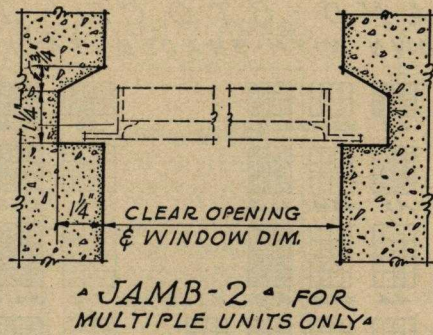
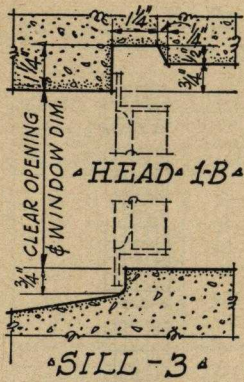
Note: Ordinary wood sash putty must not be used. See Paragraph 9, Fenestra Page 2.

(L-10c) Glazing—All Horizontally Pivoted Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel spring, glazing clips furnished by the window manufacturer. (4 clips for each fixed light and 6 for each ventilator light.) Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. See note paragraph (L-9).

(L-11) Screens

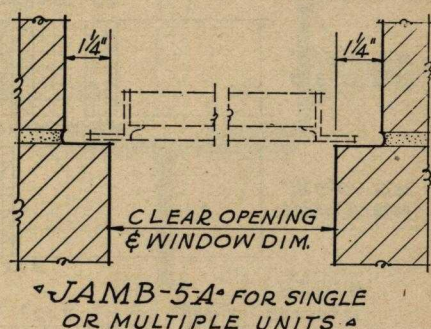
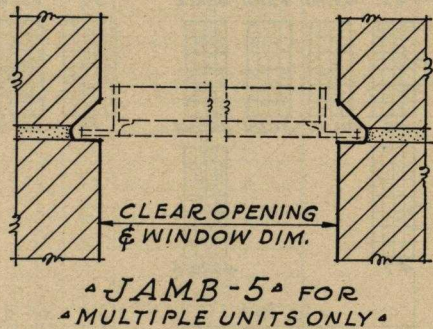
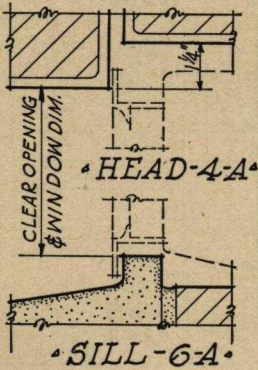
Note: Special metal pivoted ventilator screens may be used. These lie close to the ventilator, the upper half outside, the lower half inside, with insect-proof closures at ventilator pivot line. Screens are not ordinarily included by the window manufacturer and should, therefore, be provided for under another division of the specification.



JAMB-2 FOR
MULTIPLE UNITS ONLY

JAMB-2-A FOR SINGLE
OR MULTIPLE UNITS

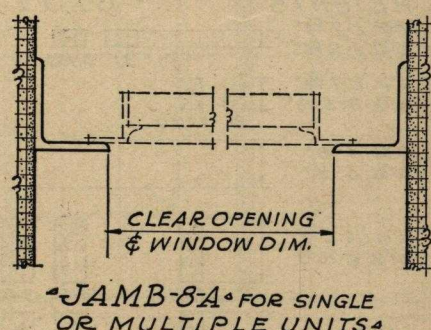
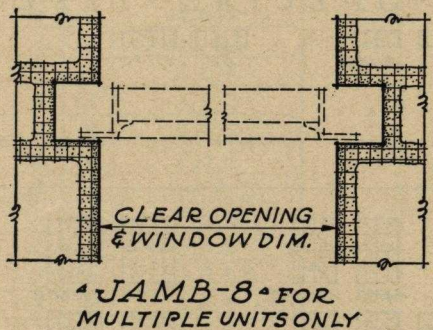
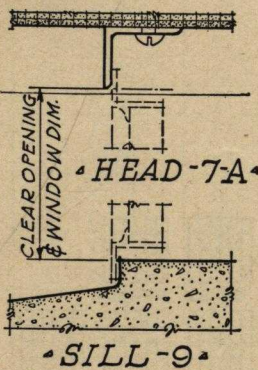
INSTALLATION IN CONCRETE



JAMB-5 FOR
MULTIPLE UNITS ONLY

JAMB-5-A FOR SINGLE
OR MULTIPLE UNITS

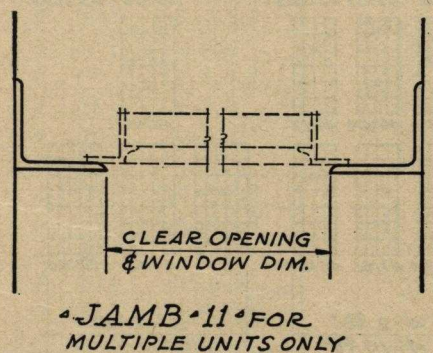
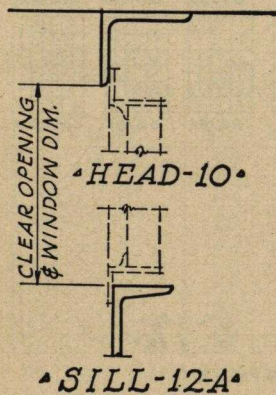
INSTALLATION IN BRICK



JAMB-8 FOR
MULTIPLE UNITS ONLY

JAMB-8-A FOR SINGLE
OR MULTIPLE UNITS

INSTALLATION IN TILE



JAMB-11 FOR
MULTIPLE UNITS ONLY

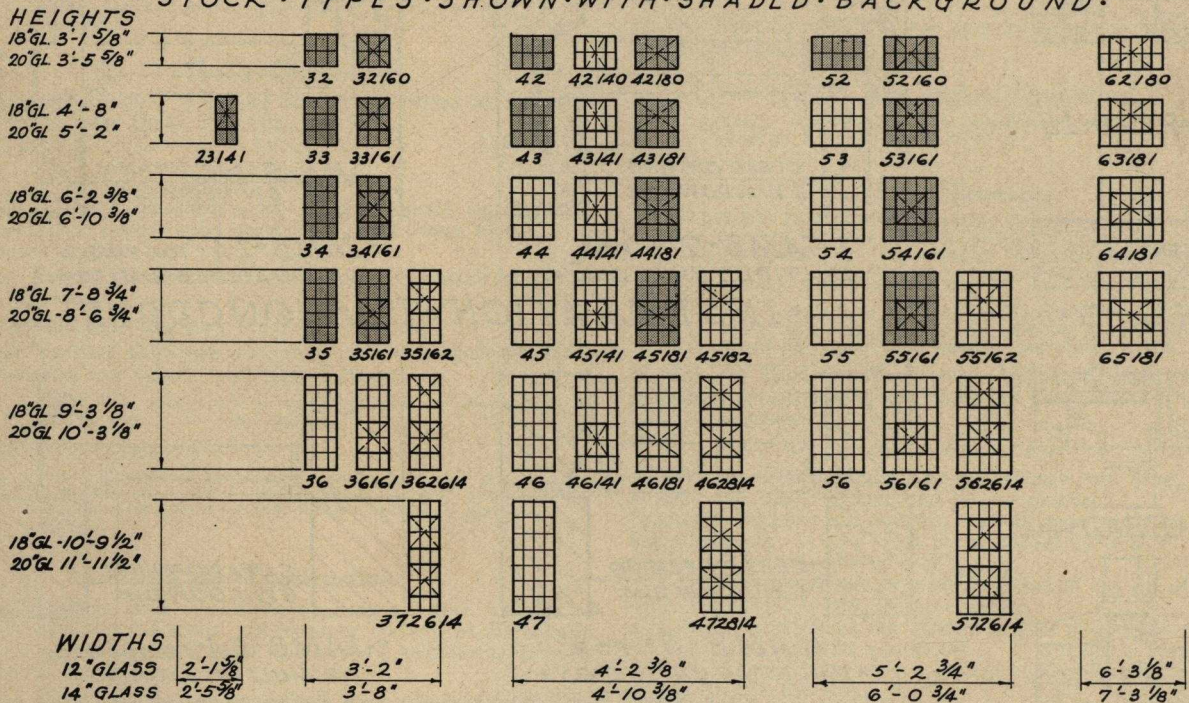
INSTALLATION IN STEEL

NOTE:-

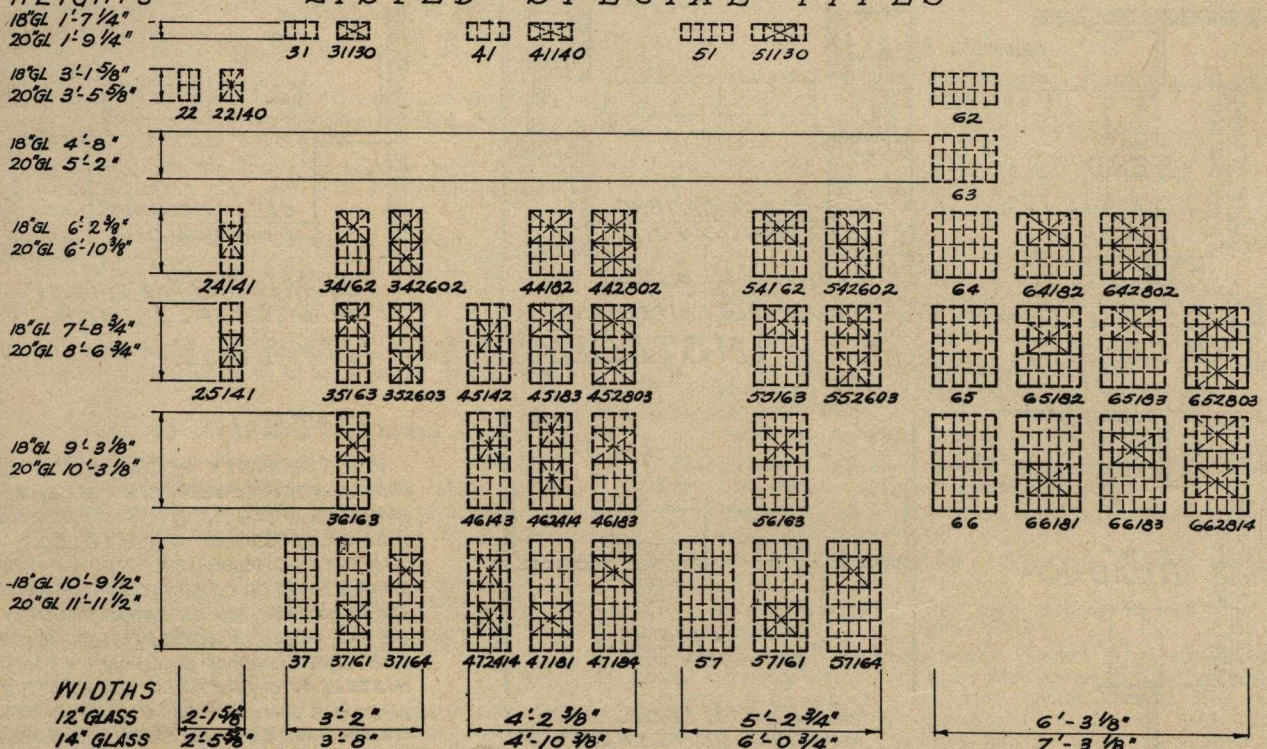
WE STRONGLY RECOMMEND THE INSTALLATION OF FENESTRA SIDEWALL WINDOWS AFTER THE WALLS OF BUILDING ARE PRACTICALLY COMPLETED.

IN EVERY CASE, REGARDLESS OF WHETHER SINGLE UNITS OR COMBINATIONS OF UNITS ARE TO BE USED, THE OPENING SHOULD BE PREPARED IN ACCORDANCE WITH THE DIMENSIONS SHOWN IN THE INSTALLATION DETAILS ON PLATES L-104 & L-105. REBATES AND ANGLES SHOWN HAVE BEEN ACCEPTED BY BUILDERS AND CONTRACTORS AS THE BEST PRACTICE AND THESE SHOULD BE CLOSELY FOLLOWED.

• STANDARD • AND • STOCK • TYPES •
• STOCK • TYPES • SHOWN • WITH • SHADED • BACKGROUND •



• LISTED • SPECIAL • TYPES •



• GLASS • COMBINATIONS • ARE • 12" • 18" • AND • 14" • 20" •

Fenestra
August 1929

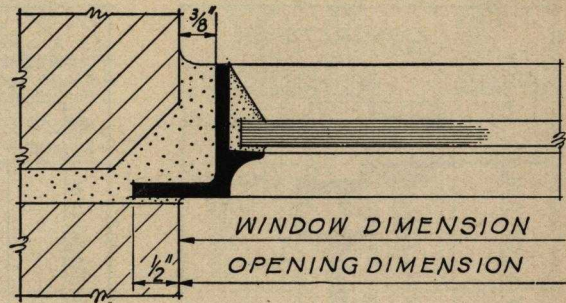
Horizontally Pivoted Windows
Types and Sizes

Plate No
L-102

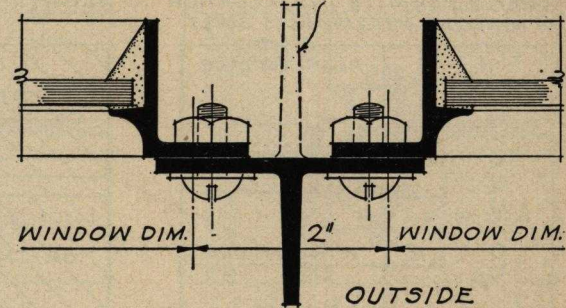
SYMMETRICAL • COMBINATIONS •

OPENING • DIMENSIONS				NO. UNITS IN OPENING	NO. LIGHTS IN OPENING	•ARRANGEMENT • OF UNITS IN OPENING • FIGURES INDICATE THE NUMBER OF LIGHTS IN WIDTH OF EACH UNIT.
18" HEIGHTS		20" HEIGHTS				
PANES	DIM.	PANES	DIM.			
2	3'-1 ⁵ / ₈ "	2	3'-5 ⁵ / ₈ "			
3	4'-8"	3	5'-2"			
4	6'-2 ³ / ₈ "	4	6'-10 ³ / ₈ "			
5	7'-8 ¹ / ₂ "	5	8'-6 ³ / ₄ "			
6	9'-3 ¹ / ₈ "	6	10'-3 ¹ / ₈ "			
7	10'-9 ¹ / ₂ "	7	11'-11 ¹ / ₂ "			
12" WIDTHS		14" WIDTHS				
* 2'-1 ⁵ / ₈ "	* 2'-5 ⁵ / ₈ "	1	2		2	
3'-2"	3'-8"	1	3		3	
4'-2 ³ / ₈ "	4'-10 ³ / ₈ "	1	4		4	
4'-5 ¹ / ₄ "	5'-1 ¹ / ₄ "	2	4		2,2	
5'-2 ³ / ₄ "	6'-0 ³ / ₄ "	1	5		5	
6'-3 ¹ / ₈ "	7'-3 ¹ / ₈ "	1	6		6	
6'-6"	7'-6"	2	6		3,3	
8'-6 ³ / ₄ "	9'-10 ³ / ₄ "	2	8		4,4	
9'-10"	11'-4"	3	9		3,3,3	
10'-7 ¹ / ₂ "	12'-3 ¹ / ₂ "	2	10		5,5	
10'-10 ³ / ₈ "	12'-6 ³ / ₈ "	3	10		3,4,3	
11'-10 ³ / ₄ "	13'-8 ³ / ₄ "	3	11		3,5,3	
11'-10 ³ / ₄ "	13'-8 ³ / ₄ "	3	11		4,3,4	
12'-8 ¹ / ₄ "	14'-8 ¹ / ₄ "	2	12		6,6	
12'-11 ¹ / ₈ "	14'-11 ¹ / ₈ "	3	12		4,4,4	
13'-2"	15'-2"	4	12		3,3,3,3	
13'-11 ¹ / ₂ "	16'-1 ¹ / ₂ "	3	13		4,5,4	
13'-11 ¹ / ₂ "	16'-1 ¹ / ₂ "	3	13		5,3,5	
14'-11 ⁷ / ₈ "	17'-3 ⁷ / ₈ "	3	14		4,6,4	
14'-11 ⁷ / ₈ "	17'-3 ⁷ / ₈ "	3	14		5,4,5	
15'-2 ³ / ₄ "	17'-6 ³ / ₄ "	4	14		3,4,4,3	
16'-0 ¹ / ₄ "	18'-6 ¹ / ₄ "	3	15		5,5,5	
16'-0 ¹ / ₄ "	18'-6 ¹ / ₄ "	3	15		6,3,6	
16'-6"	19'-0"	5	15		3,3,3,3,3	
17'-0 ⁵ / ₈ "	19'-8 ⁵ / ₈ "	3	16		5,6,5	
17'-0 ⁵ / ₈ "	19'-8 ⁵ / ₈ "	3	16		6,4,6	
17'-3 ¹ / ₂ "	19'-11 ¹ / ₂ "	4	16		4,4,4,4	
17'-3 ¹ / ₂ "	19'-11 ¹ / ₂ "	4	16		3,5,5,3	
17'-6 ³ / ₈ "	20'-2 ³ / ₈ "	5	16		3,3,4,3,3	
18'-1"	20'-11"	3	17		6,5,6	
18'-6 ³ / ₄ "	21'-4 ³ / ₄ "	5	17		3,4,3,4,3	
19'-1 ³ / ₈ "	22'-1 ³ / ₈ "	3	18		6,6,6	
19'-4 ¹ / ₄ "	22'-4 ¹ / ₄ "	4	18		3,6,6,3	
19'-4 ¹ / ₄ "	22'-4 ¹ / ₄ "	4	18		4,5,5,4	
19'-7 ¹ / ₈ "	22'-7 ¹ / ₈ "	5	18		3,4,4,4,3	
20'-7 ¹ / ₂ "	23'-9 ¹ / ₂ "	5	19		3,5,3,5,3	
21'-5"	24'-9"	4	20		5,5,5,5	
21'-5"	24'-9"	4	20		4,6,6,4	
21'-7 ⁷ / ₈ "	24'-11 ⁷ / ₈ "	5	20		4,4,4,4,4	
21'-10 ³ / ₄ "	25'-2 ³ / ₄ "	6	20		3,3,4,4,3,3	

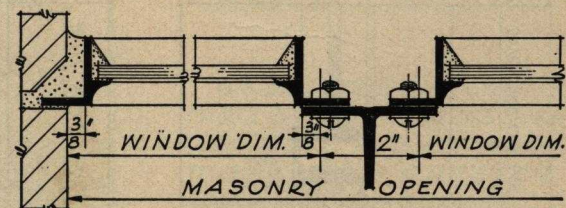
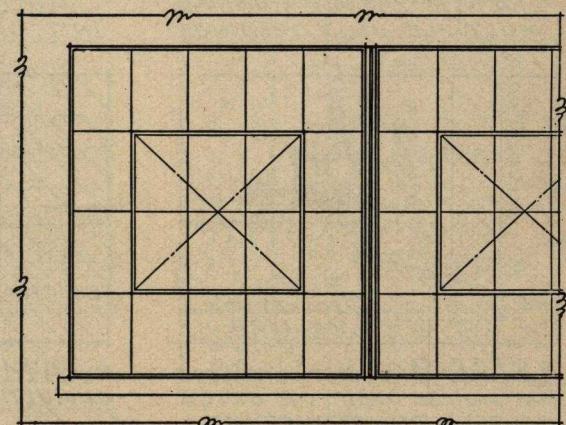
* TWO LIGHT WIDE UNITS ARE FURNISHED IN THREE LIGHT HEIGHTS ONLY • •



WHEN DESIRED STEM OF MULLION CAN BE TURNED IN AS SHOWN BY DOTTED LINES



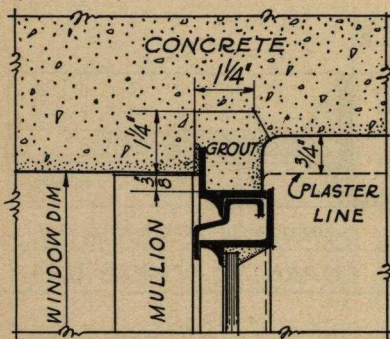
• SCALE: HALF • FULL • SIZE •



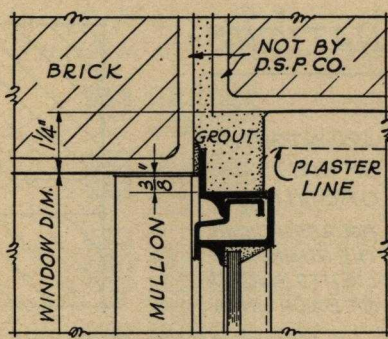
• TYPICAL • COMBINATION •

• SCALE: 3" = 1'-0" •

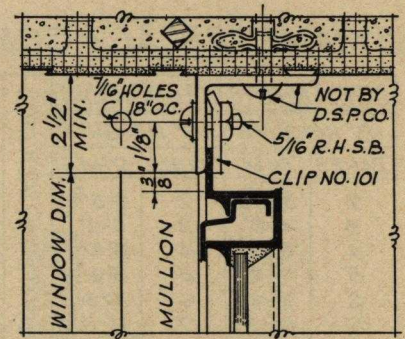
NOTE: IN FIGURING OPENING SIZES FOR COMBINED UNITS, ADD TOGETHER THE WINDOW DIMENSIONS PLUS 2" FOR EACH VERTICAL MULLION. STANDARD COMBINATIONS ARE GIVEN IN THE TABLE. WHEN USING TABLE ALWAYS COMBINE 18" HEIGHTS WITH 12" WIDTHS, AND 20" HEIGHTS WITH 14" WIDTHS.



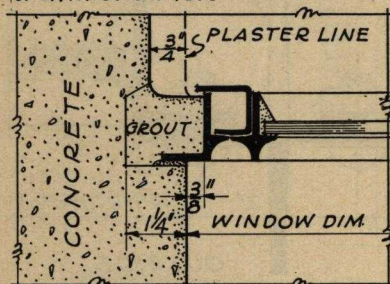
•HEAD-1-B• REBATE IN THE SOFFIT PERMITS INSTALLATION OF WINDOWS AFTER WALL IS BUILT.



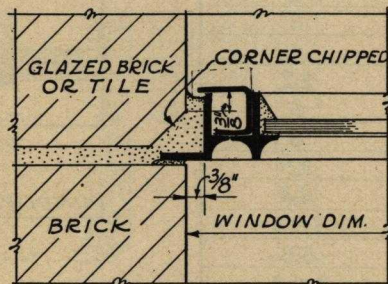
•HEAD-4-A• ANGLE SHOULD ALWAYS BE OFFSET AS SHOWN



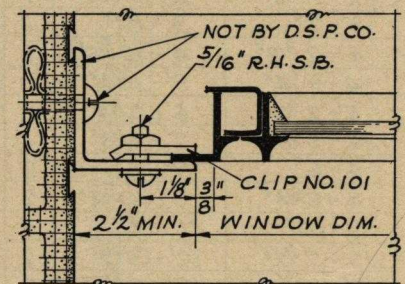
•HEAD-7-A• STEEL ANGLE FRAME IN TILE OPENINGS.



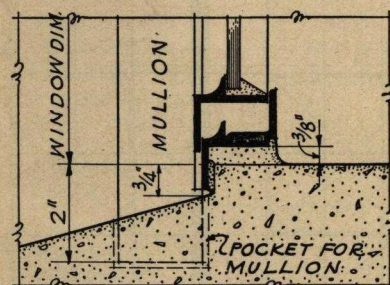
•JAMB-2-A• FOR SINGLE OR MULTIPLE UNIT OPENINGS



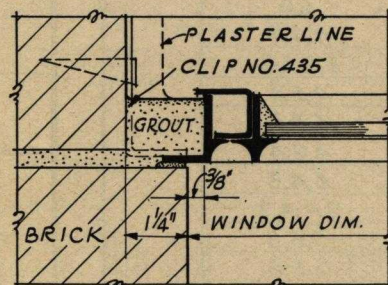
•JAMB-5• FOR MULTIPLE UNIT OPENINGS ONLY



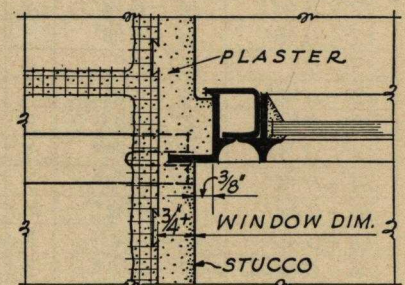
•JAMB-8-A• STEEL ANGLE FRAME IN TILE OPENINGS.



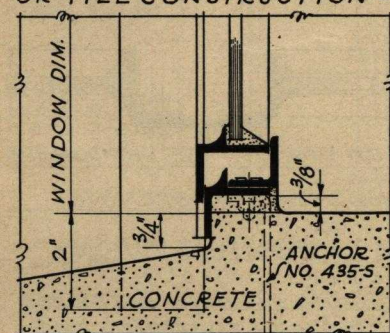
•SILL-3• PRECAST CONCRETE MAY ALSO BE USED FOR BRICK OR TILE CONSTRUCTION



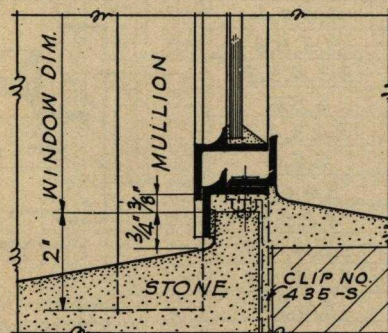
•JAMB-5-A• FOR SINGLE OR MULTIPLE UNIT OPENINGS.



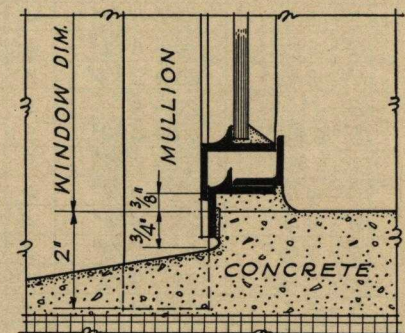
•JAMB-8-B• WITH SPLIT CLIP FURNISHED BY D.S.P.CO.



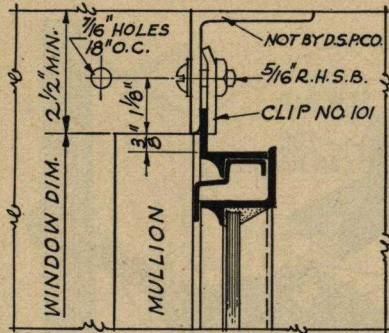
•SILL-3-A• POURED CONCRETE ANCHOR CLIP FURNISHED BY D.S.P.CO.
•CONCRETE•



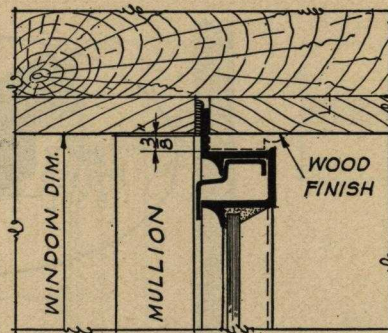
•SILL-6-A• CUT STONE. AS ALTERNATES USE DETAILS 30R3A.
•BRICK•
•SCALE: 3" = 1'-0"•



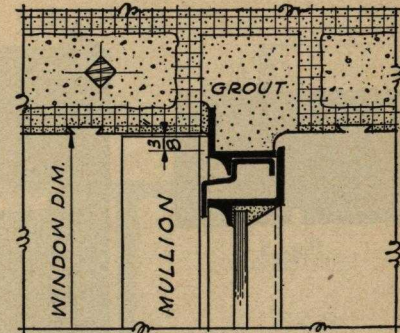
•SILL-9• CONCRETE SILL, POURED AFTER WINDOW IS SET
•TILE•



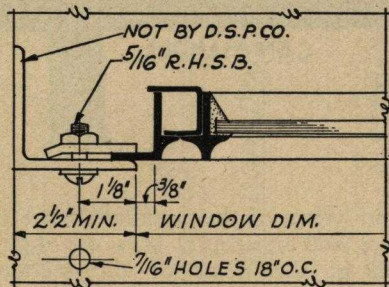
HEAD-10 STEEL ANGLE.
CLIP & BOLT FURNISHED BY D.S.P.CO.



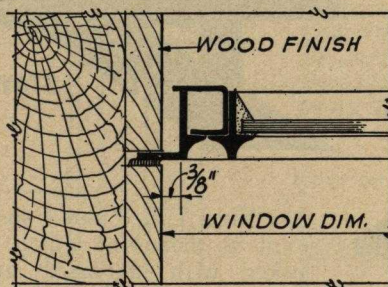
HEAD-13 DOTTED LINES
SHOW ALTERNATE FINISH



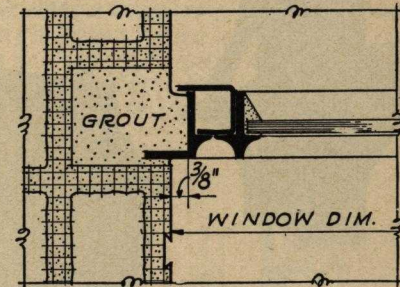
HEAD-7 FOR TILE LINTEL
WITH STEEL WINDOW RAGGLE AS SHOWN



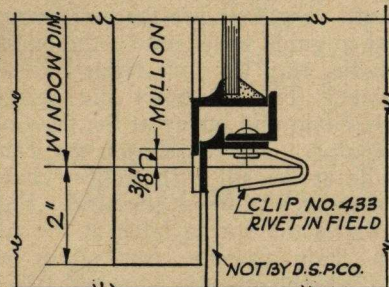
JAMB-11 STEEL ANGLE
CLIP & BOLT FURNISHED BY D.S.P.CO.



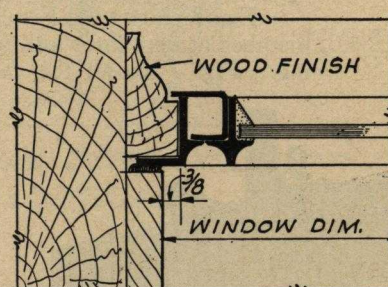
JAMB-14 PLAIN TRIM.



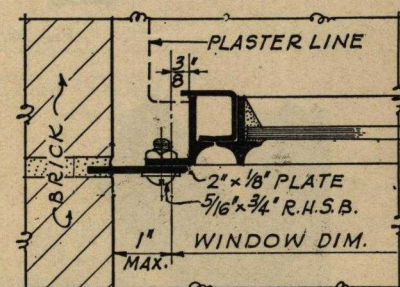
JAMB-8 FOR TILE WITH
STEEL WINDOW RAGGLE AS SHOWN.



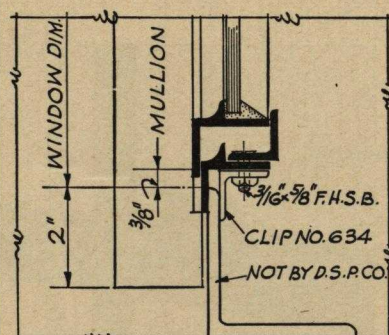
SILL-12-A STEEL CHANNEL
CLIP & RIVET FURNISHED BY D.S.P.CO.



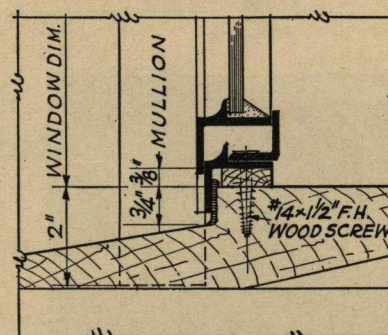
JAMB-14-A MOLDING
FINISH ALTERNATE FOR JAMB-14



JAMB-5-B DETAIL
USING JAMB PLATE



SILL-12-B STEEL ANGLE.
CLIP & BOLT FURNISHED BY D.S.P.CO.



SILL-15 WOOD APRON & SILL.

STEEL

WOOD

SCALE: 3" = 1'-0"

MISCELLANEOUS

THE MULLIONS SHOWN WITH THESE DETAILS HAVE THE STEM TURNED OUT. IT IS ADVISABLE TO DO THIS AS GREATER STIFFNESS IS SECURED.

WITH STEEL WORK THIS IS ESSENTIAL IN ORDER TO AVOID NOTCHING OF THE STEEL OR A SPECIAL CUT-OFF OF MULLIONS.

ANCHORING MULLIONS AT SILL AS SHOWN IS RECOMMENDED.

SCALE: 3" = 1'-0"

HORIZONTALLY PIVOTED WINDOW FITTINGS AND HARDWARE

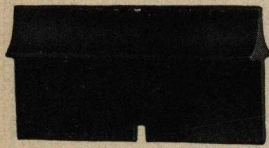


Fig. 1



Fig. 2



Fig. 3

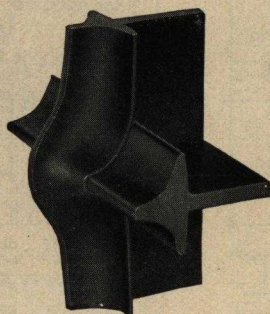


Fig. 4

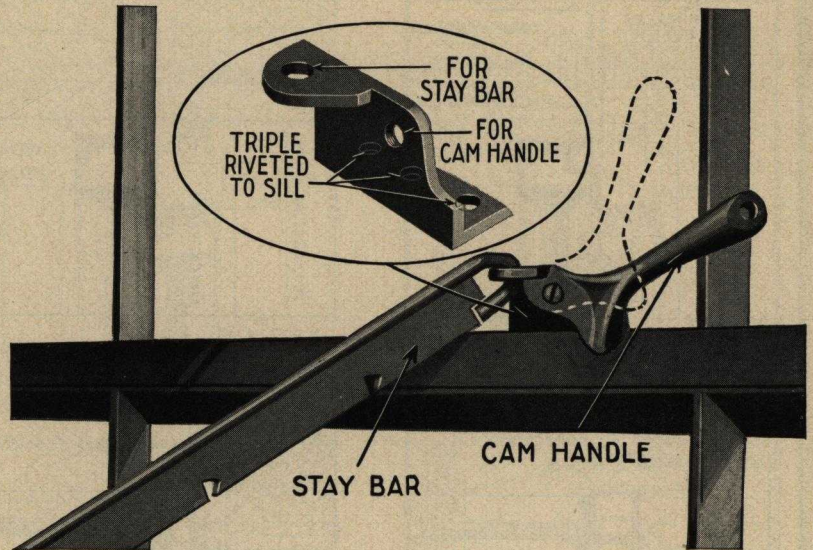


Fig. 7

Figs. 1, 2, 3 and 4 show four views of the patented Fenestra joint by means of which vertical and horizontal bars are interlocked with increased strength at the point of intersection. Fig. 1 shows the horizontal bar with nick cut out. Fig. 2 shows the vertical bar with slot. Fig. 3 shows vertical bar expanded to receive horizontal bar. Fig. 4 shows the completed Fenestra joint.

Fig. 5 shows the Fenestra butt. Fig. 6 shows the weathering member at ventilator sill, mitered to guide water out of the building. Fig. 7 shows the cam handle, stay bar and riveted Z-bar bracket. Fig. 8 shows the spring latch, chain and pulley at the head of ventilator. Fig. 9 shows the cam handle at the sill with endless chain passing over pulley at the head. Fig. 10 shows the spring latch at the sill with chain passing over pulley at head; also chain cleats attached either to the muntins or the building construction.

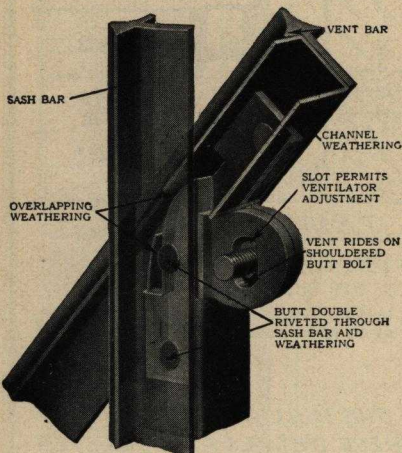


Fig. 5



Fig. 8

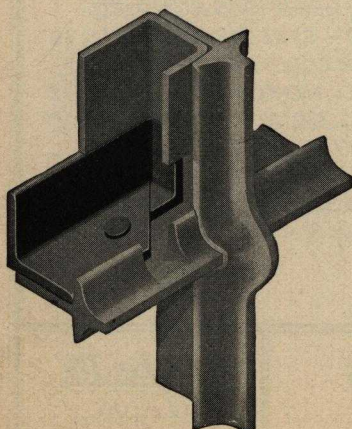


Fig. 6

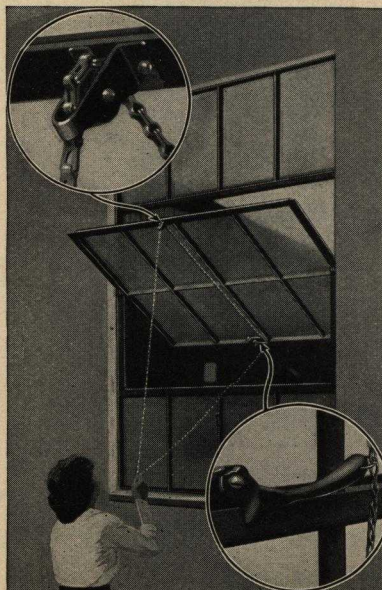


Fig. 9

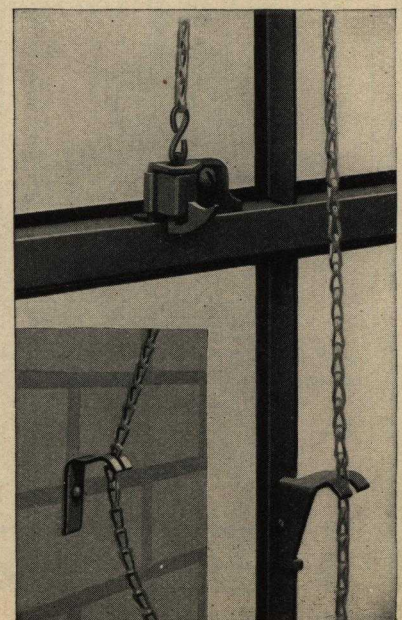
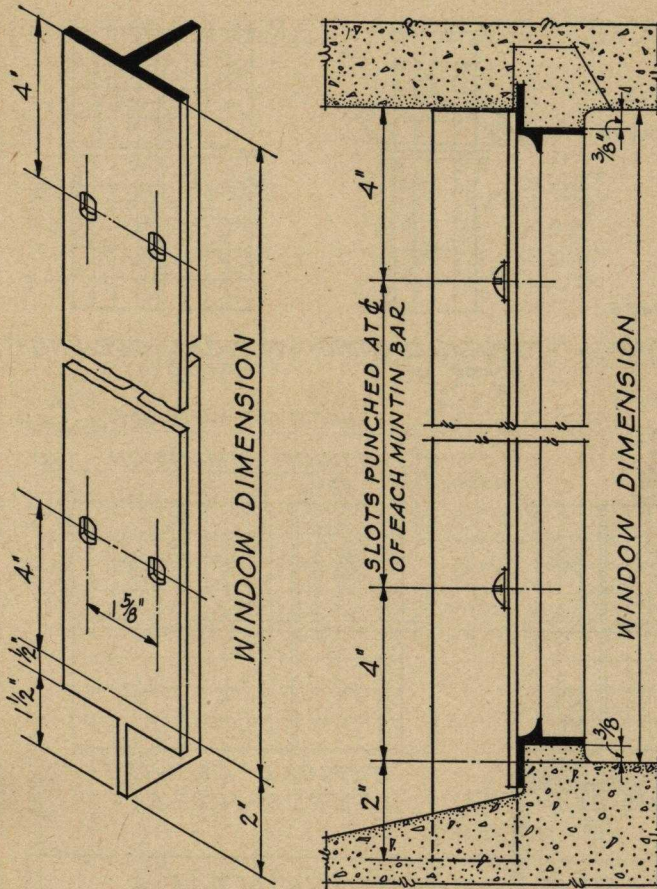
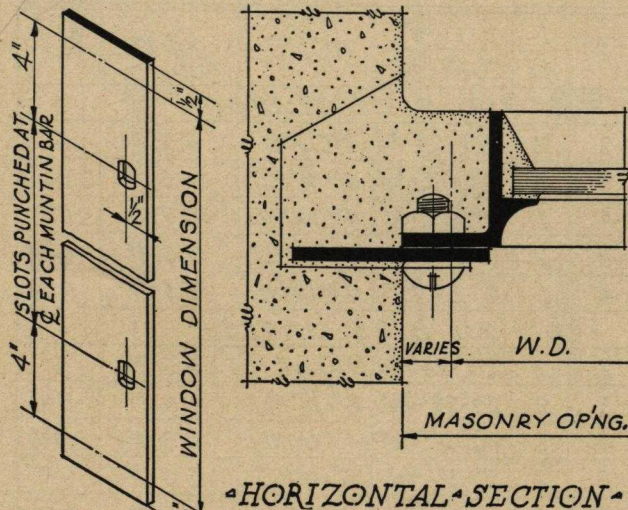


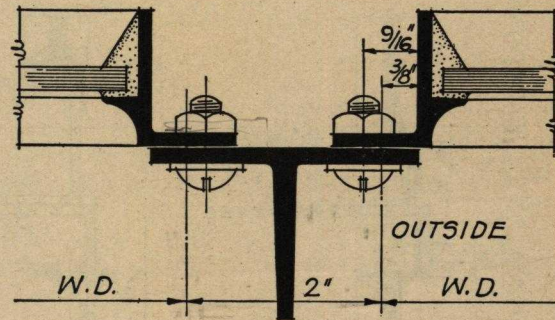
Fig. 10



• SKETCH •
• VERTICAL SECTION •
• VERTICAL MULLION DETAILS •

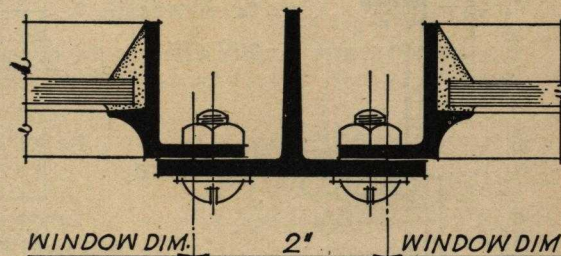


• HORIZONTAL SECTION •
• JAMB PLATE DETAILS •
• SCALE: HALF FULL SIZE •

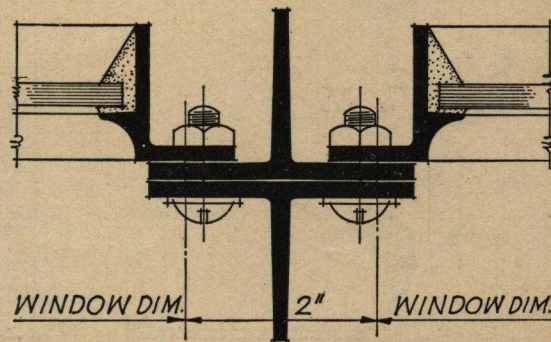


• STEM TURNED OUT •

RECOMMENDED DETAIL. THE OUTSTANDING LEG PROVIDES ADDITIONAL RIGIDITY. CAN BE USED FOR SASH UP TO 7 LIGHTS HIGH, 20" GLASS. MULLIONS MAY BE USED WITH STEM TURNED IN AS SHOWN BELOW IF DESIRED. • • • •



• STEM TURNED IN •

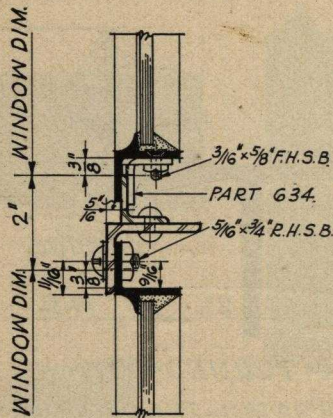


• DOUBLE MULLION •

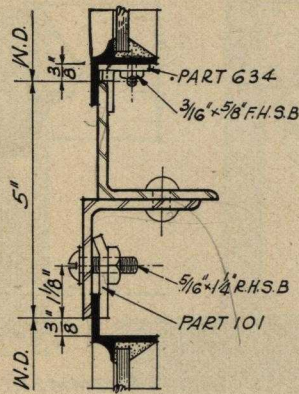
SHOULD BE USED ON SASH HIGHER THAN 7 LIGHTS 20" GLASS, OR WHERE EXTRA WIDE OPENINGS ARE TO BE FILLED AND WHERE THE EXPOSURE IS SEVERE.

NOTE: PROVISION SHOULD ALWAYS BE MADE FOR ANCHORING MULLIONS IN THE SILL. SEE VERTICAL SECTION ABOVE.

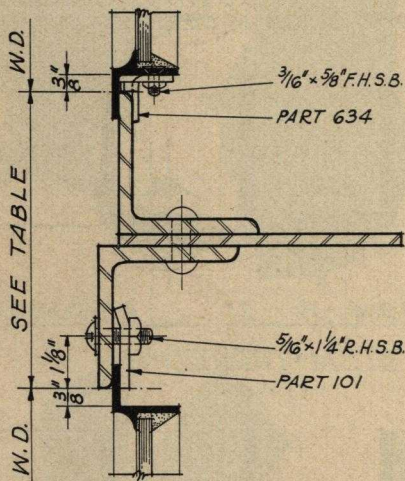
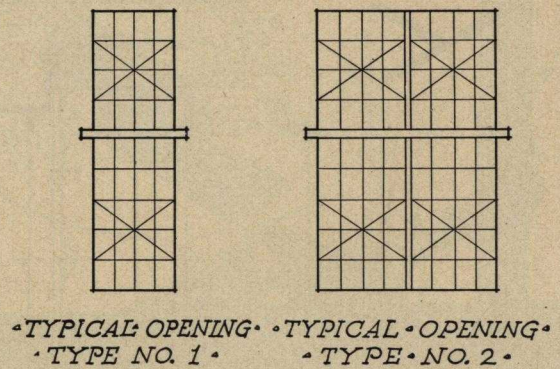
BOLT HOLES ARE PUNCHED TO MATCH THE JAMB BARS OF SASH, 4" FROM WINDOW DIMENSION POINT AT TOP AND BOTTOM AND OPPOSITE EACH MUNTIN BAR.



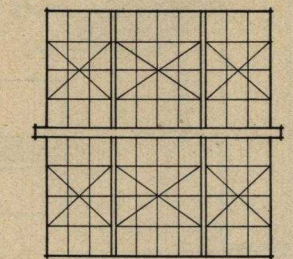
•TYPE-1•



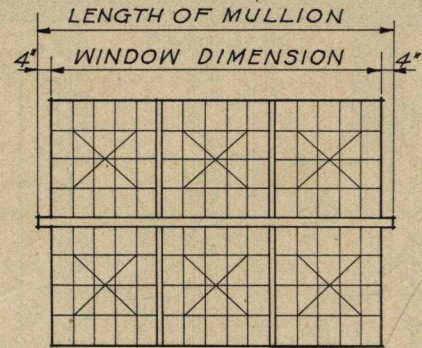
•TYPE-2•



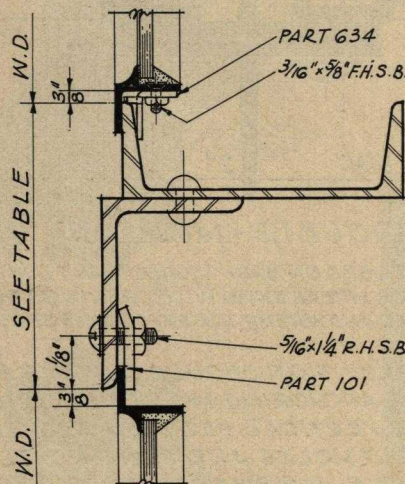
•TYPE-3•



•TYPICAL OPENING TYPES NO. 3 & 4•



•TYPICAL OPENING TYPES NO. 3 & 4•



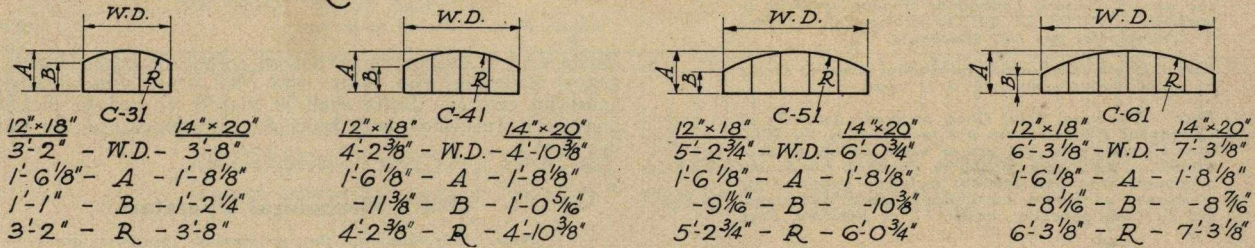
•TYPE-4•

•DETAILS SCALE: 3"=1'-0"•

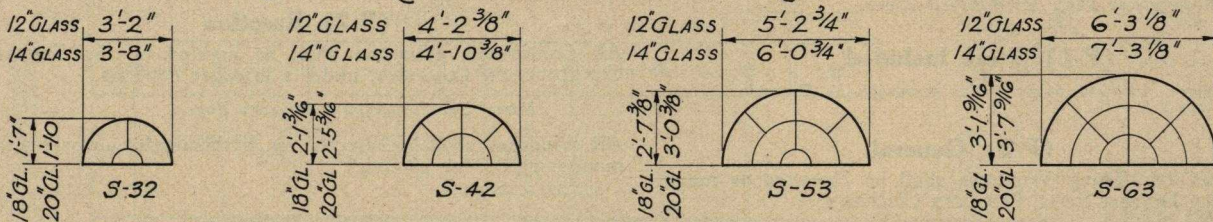
•TABLE OF HORIZONTAL MULLION SIZES•

LIGHTS WIDE	MULL TYPE NO.	•ANGLES•		PLATE OR CHANNEL	ESTIMATED WEIGHT OF MULL. PER FT.	BETWEEN WINDOW DIMENS.
		REQD.	SIZE.			
SINGLE UNIT OPENINGS	1	1	1" x 1" x 1/8"	NONE	3.0 LBS.	2"
		1	2" x 1 1/2" x 3/16"			
• 12" x 18" SIZE GLASS •						
3 TO 9	2	2	2 1/2" x 2 1/2" x 3/16"	NONE	6.5 LBS.	5"
10 TO 13	3	2	2 1/2" x 2 1/2" x 3/16"	6" x 1/4" PLT.	11.5 LBS.	5 1/4"
10 TO 13	4	1	3 1/2" x 2 1/2" x 1/4"	4" CHANNEL	10.5 LBS.	5 1/4"
14 TO 18	3	2	3" x 3" x 5/16"	6" x 1/4" PLT.	17.5 LBS.	6 1/8"
14 TO 18	4	1	4" x 3" x 5/16"	6" CHANNEL	15.5 LBS.	6 1/8"
• 14" x 20" SIZE GLASS •						
3 TO 8	2	2	2 1/2" x 2 1/2" x 3/16"	NONE	6.5 LBS.	5"
9 TO 11	3	2	2 1/2" x 2 1/2" x 3/16"	6" x 1/4" PLT.	11.5 LBS.	5 1/4"
9 TO 11	4	1	3 1/2" x 2 1/2" x 1/4"	4" CHANNEL	10.5 LBS.	5 1/4"
12 TO 16	3	2	3" x 3" x 5/16"	6" x 1/4" PLT.	17.5 LBS.	6 1/8"
12 TO 16	4	1	4" x 3" x 5/16"	6" CHANNEL	15.5 LBS.	6 1/8"

CAMBER HEAD UNITS ONE PANE HIGH



SEMICIRCULAR UNITS NOT OVER SIX PANES WIDE



ALL ABOVE CAMBER HEAD AND SEMICIRCULAR UNITS HAVE NO. 70 SECTION AT SILL FOR ATTACHMENT TO TOP OF SINGLE SQUARE HEAD UNIT, OR FOR INDIVIDUAL INSTALLATION. SEE FIG. -1- BELOW.

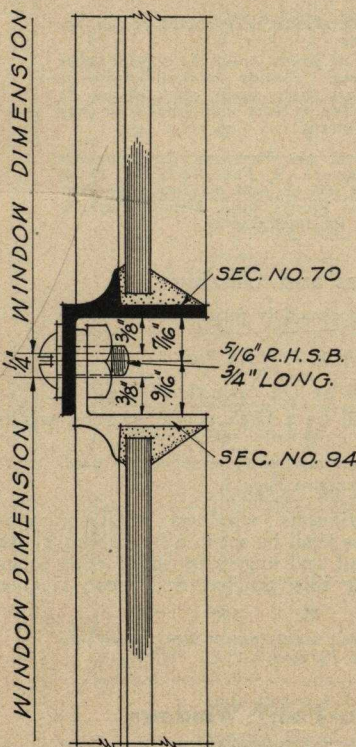


FIG. -1

SECTION THRU UNIT
UP TO AND INCLUDING
SIX PANES IN WIDTH.

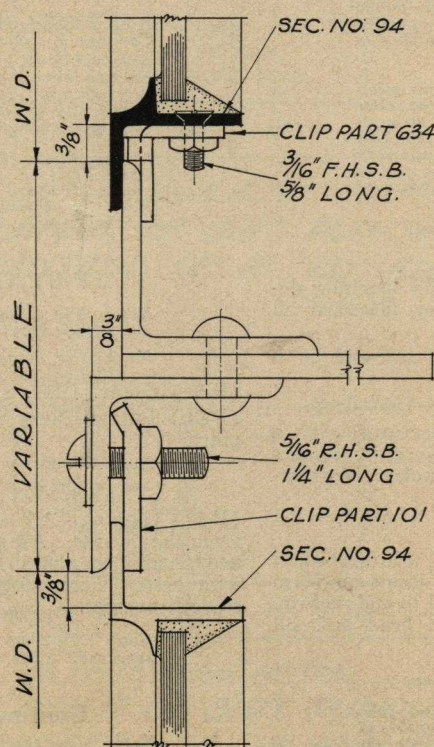
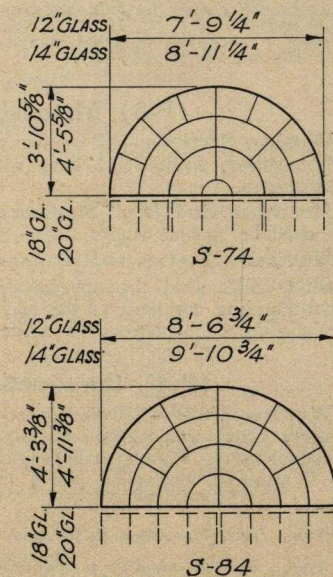


FIG. -2

SECTION THRU UNIT OVER SIX
PANES IN WIDTH. FOR SIZE OF
STRUCTURAL MULLION SEE PLATE

DETAILS SCALE: HALF-FULL-SIZE

SEMICIRCULAR UNITS MORE THAN SIX PANES WIDE



SEMICIRCULAR UNITS MORE THAN SIX PANES WIDE HAVE NO. 94 SECTION AT SILL FOR ATTACHMENT TO MULTIPLE UNIT OPENING WITH STRUCTURAL HORIZONTAL MULLION, OR FOR INDIVIDUAL INSTALLATION. SEE FIG. 2

(P) CONTINUOUS TOP HUNG WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Structural Steel Truss spacing, best adapted to the use of standard Continuous Window units, is in multiples of 4' (16', 20', 24') to accommodate standard 4' centering for girt butt attachment.

Note: Intermediate structural vertical members should be provided approximately 8' to 12' apart.

Note: Structural Steel Girts, at heads and sills of Continuous Windows, are not furnished by the Window Manufacturer, and are so noted on the window details. These girts should be provided for in the Structural Steel Specifications including punching for attachment of window butts in accordance with standard Fenestra punching details. (See Fenestra, Page 27.)

Note: Sheet metal flashing at heads, sills, and ends of runs at building construction, is not furnished by the Window Manufacturer, and is so noted on the window details. This flashing should be provided for in the Roofing and Sheet Metal Specifications.

(P-1) Work Included

Note: List and locate. (See paragraph 10, Fenestra Page 2.)

(P-2) General

Continuous Top Hung Windows shall be Fenestra as manufactured by DETROIT STEEL PRODUCTS COMPANY.

Note: Fenestra Continuous Windows are particularly designed for use in monitor and sawtooth roof construction where the plane of the windows is on a slope. They may be used in vertical planes where necessary. The chief advantage of this type of window lies in the fact that it provides for an easily and rapidly operated continuous opening from one end of the building to the other.

Note: Standard units of Continuous Windows measure 20' in length (dimension points equal the clear opening). We recommend, for the economical arrangement of operator arms and to permit girt punching on even 4' centers for butt attachment, that units vary on multiples of 4' (8', 12', 16'). Smaller units may be used, if necessary, in widths varying in multiples of 2' (8', 10', 12', 14', 16', 18').

(P-3) Materials

(P-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

(P-3b) Head and End Jamb Members—Head and end jamb members shall be special angles.

(P-3c) Muntins—Muntins shall be special Ts 1½" deep.

(P-3d) Sills—Sills shall be special design sections with a long down-standing leg bent at the end to make close contact with the building construction. Provide weep holes for drainage.

(P-4) Construction

(P-4a) Window Units—All members of the window shall be accurately fitted and rigidly riveted at the joints to form standard panel units. Panels shall be joined, end to end midway between T muntins, by splice plates bolted to head and sill members.

Note: Panels are joined at the time of erection.

Note: Riveted assembly assures a strong, tight joining of members, with sufficient flexibility to withstand unusual strain thus obviating the danger of breaks due to imperfect welds.

(P-4b) Stationary End Sections—At the ends of all swing sections next the building construction there shall be provided stationary 1' panels.

(P-4c) Stationary Intermediate Sections—Between the ends of swing sections there shall be provided stationary 2' panels.

(P-4d) Weathering Caps—The joint between ends of swing sections and stationary end sections (and stationary intermediate sections) shall be covered and protected by a specially formed, 14 gauge, steel channel with one leg secured to the end angle of the swing section and designed to overlap the end angle of the stationary section.

(P-4e) Storm Panels—Where so indicated, provide 2' wide storm panels secured to stationary end (and intermediate) panels with a steel plate and to the sill by sill clips. Panels shall underlap the swing window section and shall be provided at sill with a formed continuous drip board, set over the sill flashing.

(P-5) Attached Hardware

Note: Attached at factory.

Butts—All Continuous Windows shall be top hung on heavy malleable iron butts, with ¾" brass pins, spaced 4' apart on centers. Butts shall be rigidly riveted to the head angle and furnished with bolts for attachment to the building girts.

(P-6) Mechanical Operators

Note: Specifications for mechanical operators are given on Fenestra Pages 31 to 35. In selecting type best adapted to the particular conditions, we advise consultation with our representative.

(P-7) Erection

All Continuous Windows shall be erected by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See Paragraph 3, Fenestra Page 1.

All windows shall be erected in a thoroughly, workmanlike manner ready for glazing.

(P-8) Painting

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 3, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.

(P-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 8, Fenestra Page 2.

(P-9a) Glass—Glass shall be ¼" rough wire glass).

(P-9b) Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See paragraph 9, Fenestra Page 2.

(P-9c) Glazing—All continuous windows shall be glazed from the outside. All glass shall be set in a heavy bed of putty and secured at muntins and end angles by angle clips secured with bolts. Face putty at sills, applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. (See note Paragraph P-8.)

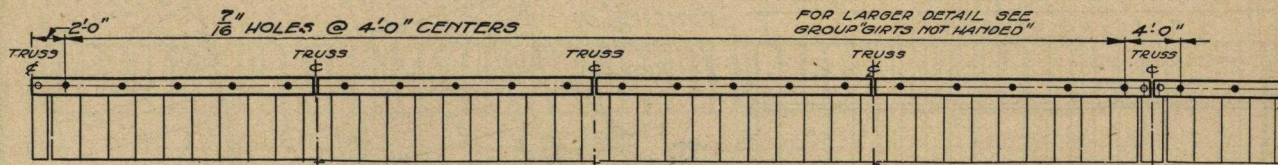
Continuous Fixed Windows

Note: The specification for Continuous Fixed Windows is the same as that for Continuous Top Hung Windows except that all window units are stationary (no swing sections). Heavy steel angle clips bolted to the window head and the building girts are substituted for the butts. Steel sill clips, furnished with the window and shipped flat, are bolted to the sill of the window and bent around the steel sill girt to rigidly secure the window in position at the bottom.

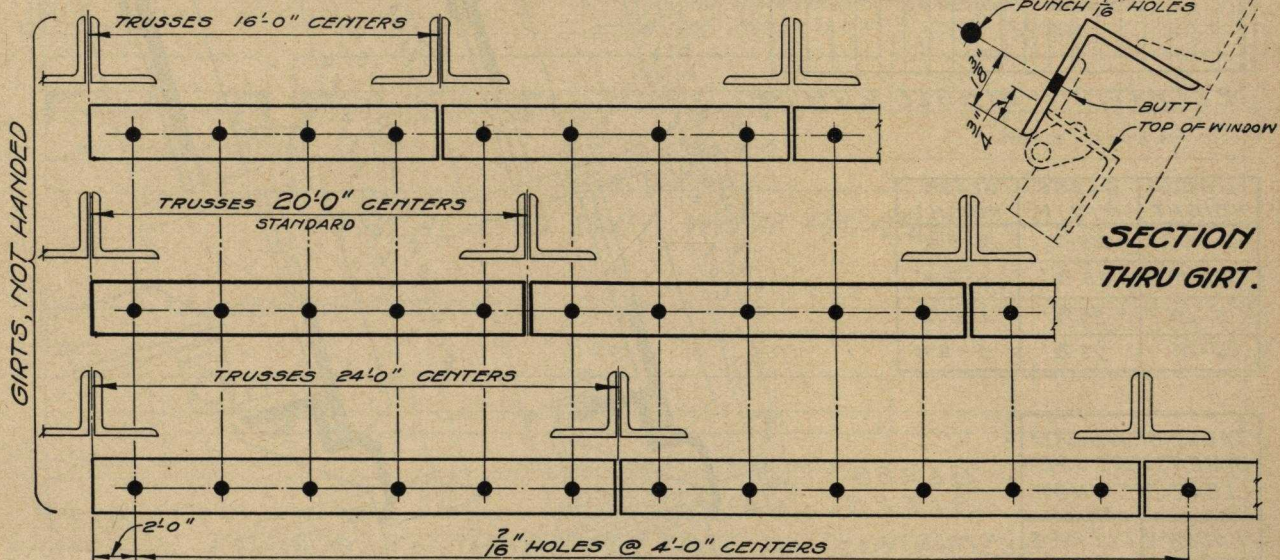
Continuous Bottom Hung Windows

Note: In general the specification for Continuous Bottom Hung Windows is the same as that for Continuous Top Hung Windows except in the following particulars:

- The head section is a special T.
- The sill section is a special angle designed to take the butts attached to a special sill girt.
- The weathering caps are attached, with the legs out, to the fixed end or intermediate panels instead of to the swing sections.
- The windows are glazed on the inside with face putty at both head and sill.

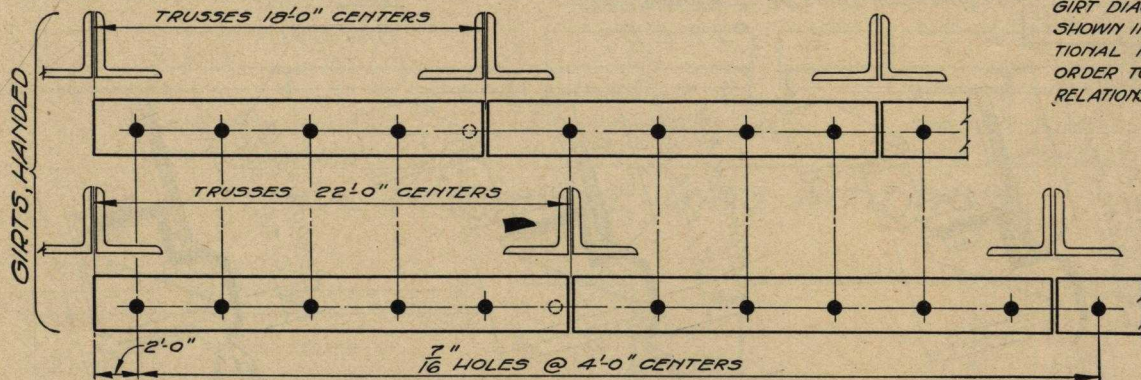


**RECOMMENDED TYPICAL LAYOUT OF GIRT PUNCHING
FOR STANDARD 20'-0" TRUSS CENTERS.**



**TYPICAL LAYOUT OF GIRT PUNCHING FOR
TRUSS CENTERS OF 16, 20 AND 24'-0"**

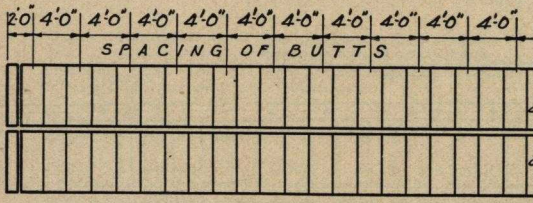
NOTE:-TRUSSES ON GIRT DIAGRAM ARE SHOWN IN A CONVENTIONAL MANNER IN ORDER TO SHOW THE RELATIONSHIP TO GIRTS.



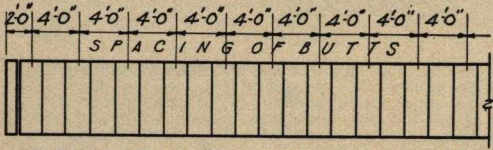
**TYPICAL LAYOUT OF GIRT PUNCHING FOR
TRUSS CENTERS OF 18 AND 22'-0"**

SPACING OF TRUSS CENTERS:-
TRUSS CENTERS OF 17, 19, 21, 23 AND 25 FEET REQUIRE FOUR STYLES OF GIRT PUNCHING (TWO RIGHT AND TWO LEFT) AND SHOULD THEREFORE BE AVOIDED.

GIRT PUNCHING:-
HOLES OCCURRING AT JOINT OF GIRTS SHOULD BE OMITTED. SUCH HOLES WILL BE LOCATED AND PUNCHED BY WINDOW ERECTORS



ELEVATION-DOUBLE RUN



ELEVATION-SINGLE RUN

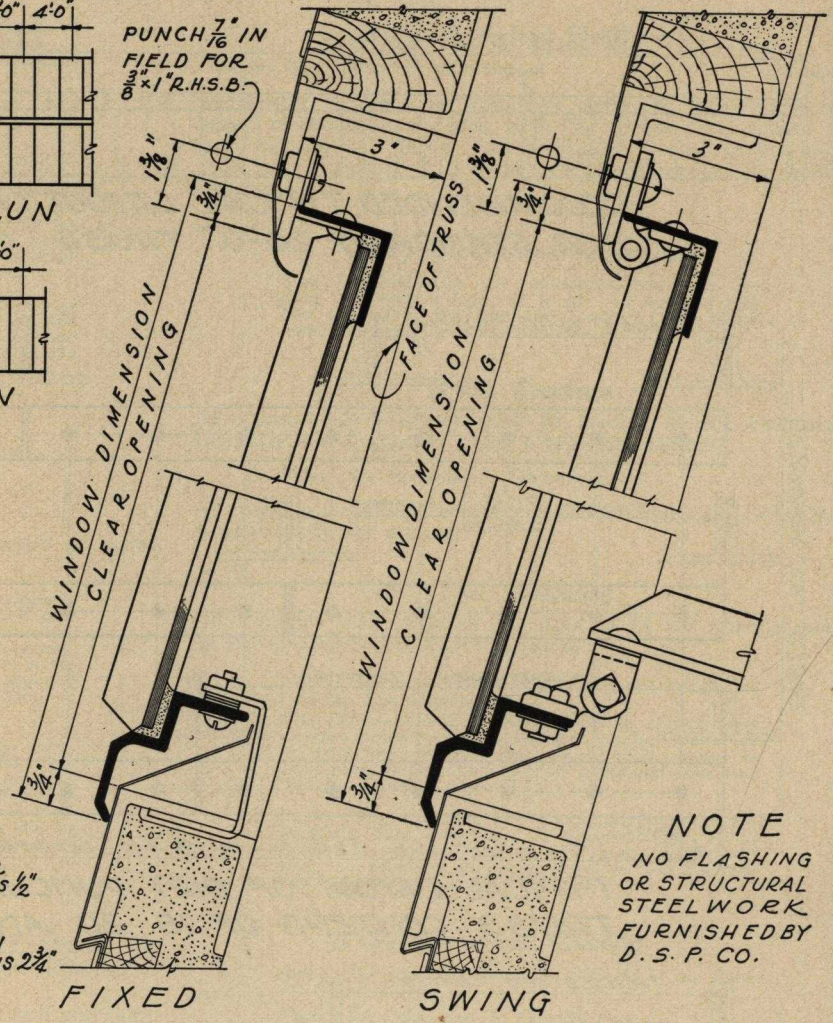
WINDOW HEIGHT	GLASS WIDTH	GLASS HEIGHT
3'-0"	23 1/2"	2'-9 1/4"
4'-0"	23 1/2"	3'-9 1/4"
5'-0"	23 1/2"	4'-9 1/4"
6'-0"	23 1/2"	5'-9 1/4"

TABLE OF WINDOW DIMENSIONS AND CLEAR OPENINGS.	
WINDOW-D.	CLEAR O.
3'-0"	2'-10 1/2"
4'-0"	3'-10 1/2"
5'-0"	4'-10 1/2"
6'-0"	5'-10 1/2"

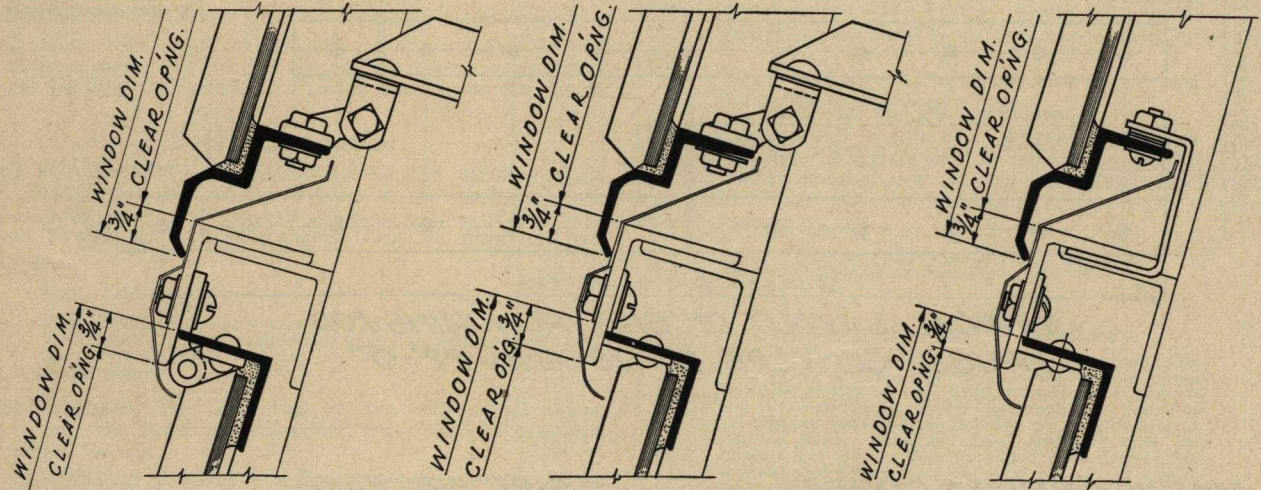
GLASS SIZES

WIDTH
EQUALS BAR
CENTERS MINUS 1/2"

HEIGHT
EQUALS SASH
DIMENSION MINUS 2 3/4"



NOTE
NO FLASHING
OR STRUCTURAL
STEEL WORK
FURNISHED BY
D. S. P. CO.

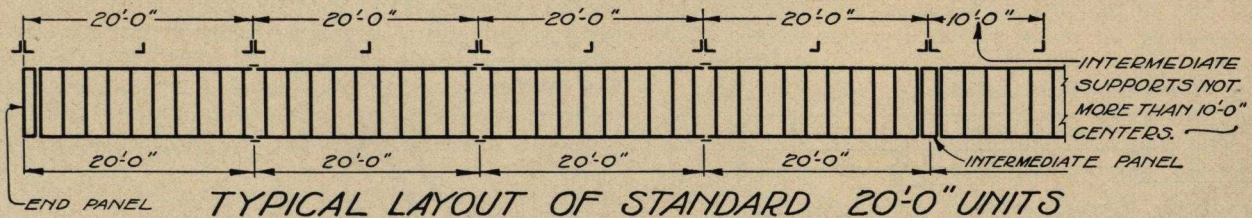


SWING OVER SWING

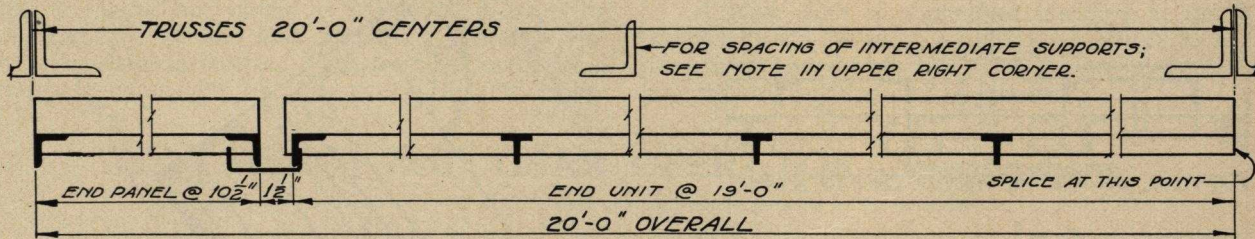
SWING OVER FIXED

FIXED OVER FIXED

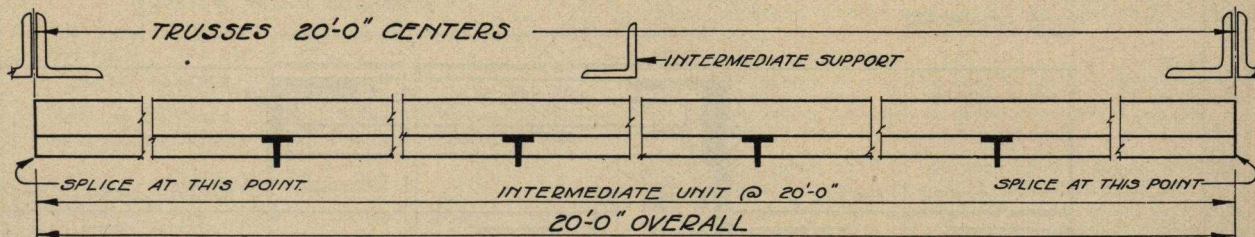
SCALE: 3"=1'-0"



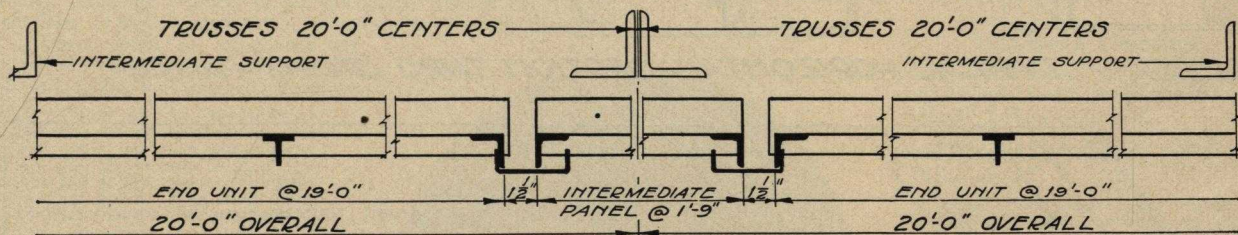
TYPICAL LAYOUT OF STANDARD 20'-0" UNITS



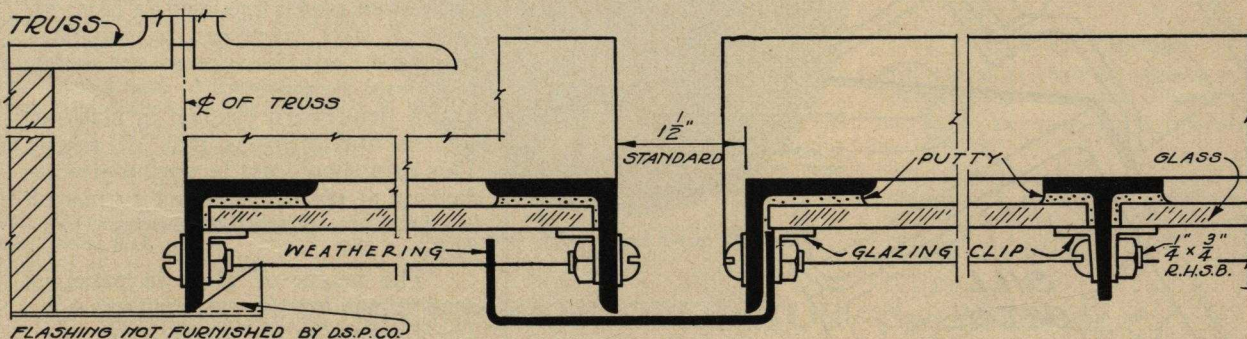
TYPICAL END UNIT WITH PANEL



TYPICAL INTERMEDIATE UNIT WITHOUT PANELS

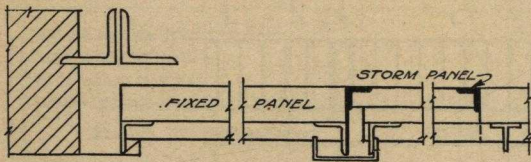


TYPICAL INTERMEDIATE UNITS WITH PANEL

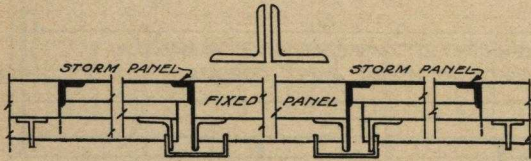


HORIZONTAL SECTION AT END OF RUN

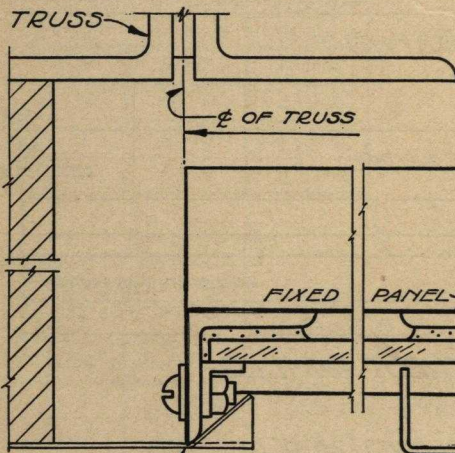
— SCALE: HALF-FULL SIZE —



TYPICAL DETAIL AT END OF SWING RUN

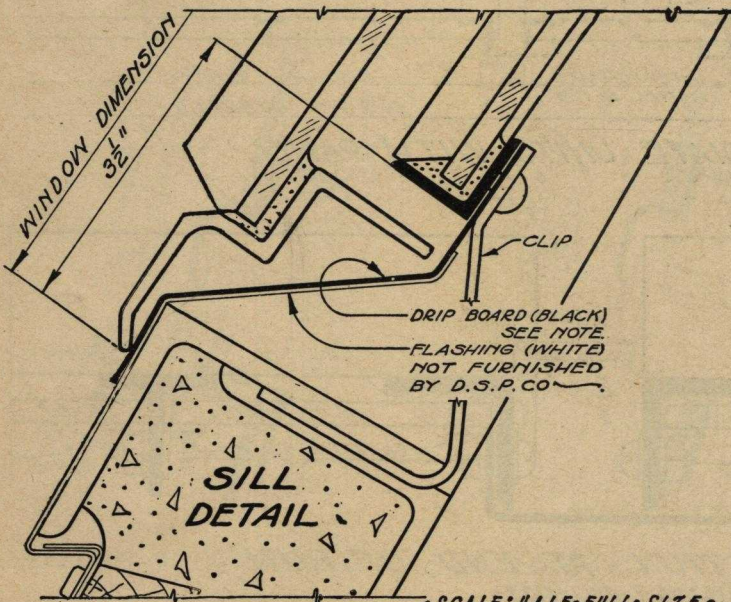
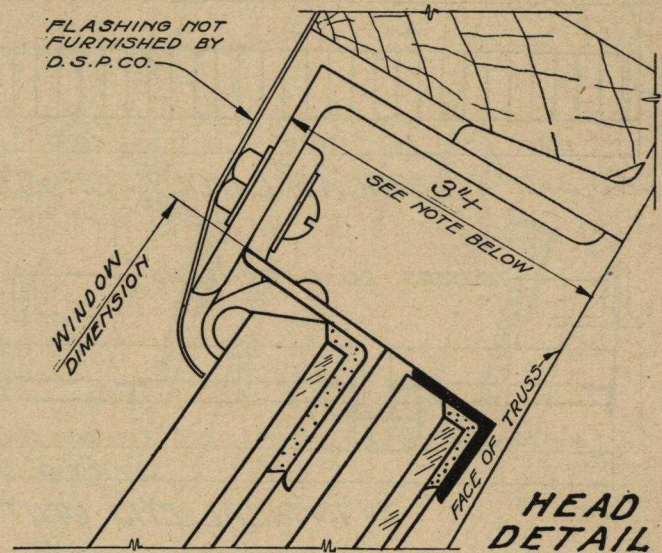


TYPICAL DETAIL BETWEEN SWING RUNS



FLASHING NOT
FURNISHED
BY D.S.P.CO.

TYPICAL HORIZONTAL SECTION THRU STORM PANEL



SCALE: HALF-FULL-SIZE.

NOTE

Storm panels can be used only with top hung windows. They are recommended only for windows 30° or less off the vertical.

When panels are used in front of vertical steel members or diagonal bracing a clear distance of not under 4 in. must be used.

A drip board (shown in black at sill) is furnished as part of panel. This drip should not be confused with flashing at sill which is not furnished by DETROIT STEEL PRODUCTS COMPANY.

The height of glass in panel is equal to window dimension minus 4 in. The glass width is 1 ft. 11½ in.

Fenestra
August 1929

Continuous Windows, Top Hung
Storm and End Panels

Plate No
P-104

MECHANICAL OPERATING DEVICES

While the designing of mechanical operators for the various types of Fenestra windows is not in any sense complicated, so many different building conditions are encountered that it is impossible to lay down hard and fast rules, limits and specifications which the architect may use without first consulting a Fenestra representative.

The following specifications and plates therefore should be regarded as explanatory and advisory only.

Fenestra operators are not sold as separate and distinct products, but rather as a method of securing the satisfactory opening and closing of Fenestra windows by mechanical means. Therefore, any mechanical operators recommended by Fenestra representatives are

just as dependable as the Fenestra butt or cam handle or any other standard device which the architect himself might specify.

All operating equipment, and especially electrically controlled equipment, needs occasional inspection and lubrication. Therefore, provision should be made by which powers and motors may be reached without undue inconvenience. A "cat walk" or a movable platform is suggested where ladders are impractical.

A plate door is sometimes installed in the fixed panels between the runs of Continuous Windows so that the powers may be reached from the roof. Such doors may be had at added cost if specified.

(SA) WORM AND GEAR OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: This operator is designed primarily for horizontally pivoted ventilators but may, in some cases, be used on top pivoted ventilators.

(SA-1) Work Included

Note: List and locate. (See paragraph 10, Fenestra Page 2.)

(SA-2) General

All operators, so indicated, shall be Fenestra Worm and Gear as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(SA-3) Material

(SA-3a) Power—Power shall be a machine cut, cast iron worm operating a cast iron segmental worm gear assembled in a steel power housing designed for adjustable attachment to the supporting bracket. The worm shall be equipped with a ball thrust bearing to eliminate friction. The hub of the segment gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. Power shall be supported on heavy steel brackets adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes or other obstructions. Note: The power may be located at either end of the run or at any intermediate point. Recommended limits are given on Fenestra Page 37.

(SA-3b) Power Transmission—Power line shall be 1" black, wrought iron pipe joined into a continuous line by steel pipe plugs, with a drive fit, riveted in two directions. Line shall be supported on adjustable steel brackets, bolted to the window mullions or to the building construction. Adjustable steel operating arms (one to each ventilator) shall be rigidly clamped to the line and pivoted to steel arm extensions attached to the ventilators through steel hinge brackets.

(SA-3c) Manual Operation—

Note: Select type.

(1) Chain—Power shall be operated by a chain, operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the flattened end of the worm shaft and shall be secured by a set screw. A cotter pin through end of the shaft shall be provided for additional protection.

Note: When the power must be erected in an inclined or inverted position (see Note SA-3a) to clear obstructions or to make the ventilators visible from the operating station, chain may be carried over idlers to any convenient point.

(2) Pipe—Power shall be operated by a 1" black, wrought iron pipe connected to the worm shaft and carried down vertically to a miter gear (with removable crank) encased in a gear box adapted to rigid attachment to the building construction approximately 4' above the floor.

Note: When the power is installed in an inclined or inverted position (see Note SA-3a) the pipe may be offset through the use of universal joints.

(SA-4) Painting

All operators shall be painted one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

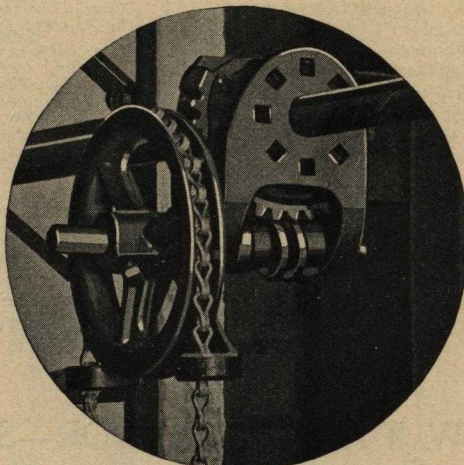
Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 3, Fenestra Page 1), at reasonable added cost will do field painting after erection. If required, so specify, including specifications for paint and its application.

(SA-5) Erection

All operators shall be erected by the FENESTRA CONSTRUCTION COMPANY.

Note: See Paragraph 3, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.



Power for Worm and Gear Operator

(SB) RACK AND PINION OPERATOR—Specifications

Notes are explanatory or advisory only, and need not be included in the specifications.

Note: This operator is primarily adapted for use on ventilators pivoted 4" from the top, but can be used successfully on horizontally pivoted ventilators.

(SB-1) Work Included

Note: List and locate. (See Paragraph 10, Fenestra Page 2.)

(SB-2) General

All Operators, so indicated, shall be Fenestra Rack and Pinion as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(SB-3) Material

(SB-3a) Power—

Note: Three types of power are available. Select and specify that best adapted to the condition.

Note: Power may be located at either end of the run or at any intermediate point of the run. Recommended limits are given on Fenestra Pages 38 and 39.

(1) Light Power—Light Power shall be a 32 to 1 reduction, machine cut steel, worm operating a semisteel worm gear

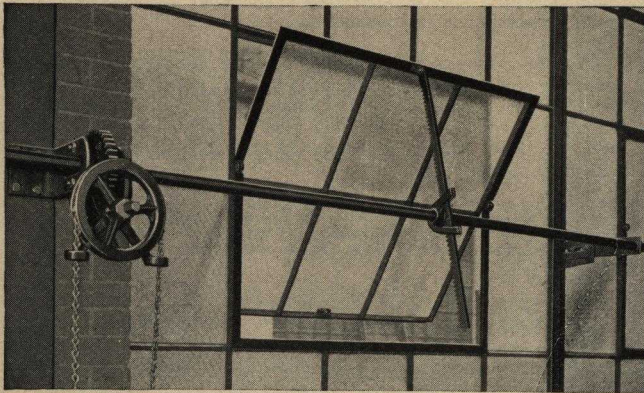
Detroit Steel Products Company

assembled in a steel power housing designed for adjustable attachment to the supporting bracket. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. Power shall be supported on a heavy steel bracket adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes, or other obstructions.

(2) **Heavy Power**—Heavy Power shall be a 45 to 1 reduction machine cut, steel worm operating a semisteel worm gear assembled and oil-encased in a dustproof gear box. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line to which it shall be securely attached so as to rotate the line on the gear axis. Power shall be supported on a heavy steel bracket adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes, or other obstructions.



Rack and Pinion Operator, Manually Controlled

(3) **Electrical Power**—Electrical Power shall be a 71 to 1 reduction, machine cut, steel worm operating a semisteel worm gear assembled and oil-encased in a dustproof gear box. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. The power shall be operated by a cast iron sprocket wheel keyed to the worm shaft and motor driven through a chain drive. The electrical equipment shall be mounted directly beneath and joined to the power gear case forming a complete power unit. The power unit shall be supported on heavy steel brackets adapted to rigid attachment to the building construction.

Note: Complete specifications of Electrical Equipment are given on Fenestra Page 35 and should be included here.

(SB-3b) **Power Transmission**—Power Transmission lines shall be 1" black, wrought iron pipe joined into a continuous

line by steel pipe plugs, with a drive fit, riveted in two directions.

Lines shall be supported on adjustable, steel brackets, bolted to window mullions or to building construction.

Operating arms (one to each ventilator) shall be straight steel racks, clamped in mesh with pinions, rigidly secured to the line. (Arms shall be attached at the head of horizontally pivoted ventilators to pressed steel hinge brackets, and shall pull in.) (Arms shall be attached at the sill of top pivoted ventilators to Z bar brackets through pressed steel hinge brackets and shall push out.)

Note: Specify either or both arm attachments as required.

(SB-3c) Manual Operation—

Note: Select either type for "Light" or "Heavy" Power. Omit if Electric Power is used.

(1) **Chain**—Power shall be operated by a chain operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the flattened end of the worm shaft and shall be secured by a set screw. A cotter pin through the end of the shaft shall be provided for additional protection.

Note: When the power must be erected in an inclined or inverted position (see Note SB-3a) to clear obstructions or to make the ventilators visible from the operating station, the chain may be carried over idlers to any convenient point.

(2) **Pipe**—Power shall be operated by a 1" black wrought iron pipe connected to the worm shaft and carried down vertically to a miter gear (with removable crank) encased in a gear box adapted to rigid attachment to the building construction approximately 4' above the floor.

Note: When the power is installed in an inclined or inverted position (see Note SB-3a), the pipe may be offset through the use of universal joints.

(SB-3d) **Electrical Operation**—Power shall be electric, motor operated.

Note: See Electrical Power (SB-3a3).

(SB-4) Painting

All operators shall be painted with one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY, (see Paragraph 3, Fenestra Page 1,) at reasonable added cost, will do field painting after erection. If required so specify here, including specifications for paint and its application.

(SB-5) Erection

All operators shall be erected by the FENESTRA CONSTRUCTION COMPANY.

Note: See Paragraph 3, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect operating condition.

(SC) SCREW TYPE OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: This operator is designed primarily for use on exceptionally high openings such as those in power houses, entirely filled with windows and structural mullions. It may be used on either horizontally pivoted ventilators or ventilators pivoted 4" from the top in individual bays, either within or beyond reach from the floor. The operator lies close to the inside face of the window out of the way of cranes and other obstructions. Where so provided for, powers and electrical mechanism may be concealed within the wall.

(SC-1) Work Included

Note: List and locate. (See Paragraph 10, Fenestra Page 2.)

(SC-2) General

All Operators, so indicated, shall be Fenestra Screw Type as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(SC-3) Material

(SC-3a) Power—

Note: Two types of power are available. Select and specify that best adapted to the condition.

Note: The power may be located at either side of the opening or at any intermediate point. Recommended limits are given on Fenestra Pages 40 and 41.

Note: In bays of extreme width and height, flexibility of ventilator control may be secured by operating the upper runs from one power and the lower runs from another.

(1) **Manual Power**—Power shall be applied through open bevel gears to operate a $\frac{3}{4}$ " vertical threaded, steel shaft in an upward and downward direction.

Note: The operation is similar to that of an automobile jack.

Detroit Steel Products Company

Gears shall be operated by a hand wheel provided with a handle.

The power shall be assembled within and shall be supported by an open, cast iron housing adapted to rigid attachment to the window mullion or building construction.

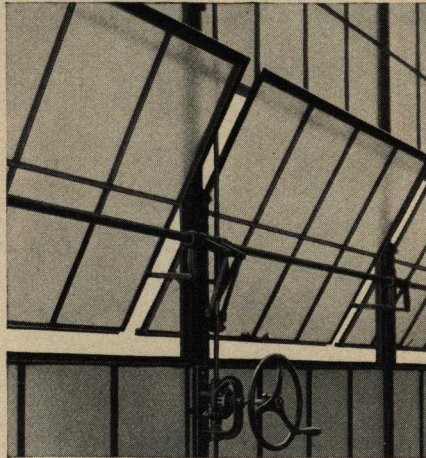
Provide a guide secured to the vertical shaft which shall fit over a guide T, attached to the window mullion. Guide T shall be provided with stops which shall limit the travel of the guide and shaft.

(2) **Electrical Power**—Power shall be applied through bevel gears to operate a $\frac{3}{4}$ " vertical threaded, steel shaft in an upward and downward direction. The gears shall be assembled and oil-encased in a dust-proof gear-box. Gears shall be operated by electrical power either direct connected through a universal joint or by means of a cast iron sprocket and chain drive.

The electrical equipment and the gear case shall be mounted to form a complete unit on a heavy steel bracket plate adapted to rigid attachment to the building construction.

Note: Complete specifications of Electrical Equipment are given on Fenestra Page 53 and should be included here.

(SC-3b) **Power Transmission**—Power transmission lines shall be 1" black wrought iron pipe joined into a continuous line by steel plugs, with a drive fit riveted in two directions. Lines shall be supported close to the face of the win-



Screw Type Operator, Manually Controlled

(SD) TENSION OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Tension Operators are in general design and operation similar to Continuous Operators. They are made for use on long runs of horizontally pivoted windows. The chief difference is in the design of operating arms and the chief advantages lie in its easy operation and the fact that windows up to 300' may be operated from one power.

Note: To avoid repetition where the specifications are the same as that for Continuous Operator this is so noted. Where not identical, use clauses here given. For specification for Continuous Operator, see Fenestra Page 34.

(SD-1) Work Included

Note: Same as (SE-1).

(SD-2) General

All horizontally pivoted ventilator operators, so indicated, shall be Fenestra Tension Operators as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(SD-3) Material

(SD-3a) Power—

Note: Same as (SE-3a).

(SD-3b) Stops—

Note: Include only where Manual operation is used.

On either side of the power case, the worm shaft shall extend to receive rigidly attached, double, steel, stop clutches (two in all). As the operator opens the window an auxiliary stop attached to the rack shall strike the upper end of a steel lever (pivoted to a bracket on the power case) causing the lower end of the lever (which is broached over the worm shaft) to engage one of the stop clutches and cut off the power. When the operator closes the window, a similar arrangement shall function to automatically cut off power at the proper point. Levers and clutches for each stop shall be automatically disengaged by coil springs. No stop which merely halts the movement of the power line without cutting off the power will be accepted.

(SD-3c) Power Supports—

Note: Same as (SE-3c).

dow on heavy cast iron brackets rigidly attached to the mullions and building construction. Cast iron pivoted lever arms (two to each ventilator) shall be rigidly clamped to the power lines and attached to the ventilator jamb bars with malleable iron hinge brackets.

Heavy cast iron cross heads, secured to the vertical power shaft, shall operate attached cast iron rocker arms rigidly clamped to the power lines. When the power is applied the rocker arms shall rotate the power lines.

(SC-4) Painting

All operators shall be painted with one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specifications for paint and its application.

(SC-5) Erection

All operators shall be erected by the FENESTRA CONSTRUCTION COMPANY.

Note: See Paragraph 3, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.

(SD-3d) Power Transmission—

Note: Same as (SE-3d).

(SD-3e) **Operating Arms**—Operating arms shall be adjustable, straight, steel channels. Arms shall be rigidly attached, through a malleable iron and steel universal swivel clamp, to the tension line and the other end shall be secured to the top of the window through a steel pivoted hinge. Arms shall operate to pull the window in from the top.

(SD-3f) Manual Operation—

Note: Same as (SE-3f).

(SD-3g) Electrical Operation—

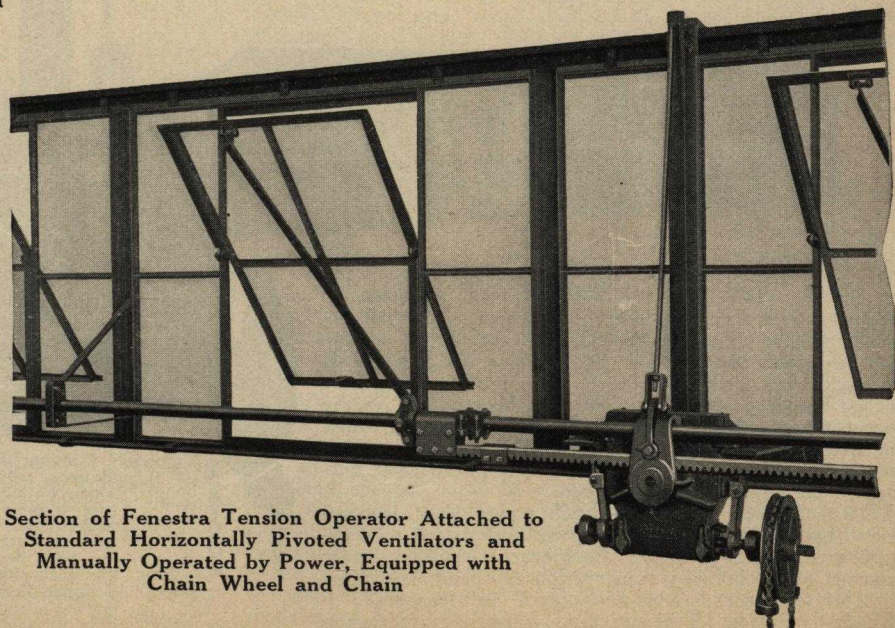
Note: Same as (SE-3g).

(SD-4) Painting

Note: Same as (SE-4).

(SD-5) Erection

Note: Same as (SE-5).



Section of Fenestra Tension Operator Attached to Standard Horizontally Pivoted Ventilators and Manually Operated by Power, Equipped with Chain Wheel and Chain

(SE) CONTINUOUS OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: This operator is designed to operate from a single power, one or several continuous windows in line (top hung, or bottom hung) located in either vertical or sloping planes.

Note: The power developed through the tension line is applied to the window through straight motion levers so arranged that the leverage increases faster than the load thus making the operation continuously easier as the window opens. This is a basic principle exclusive in Fenestra Continuous Operator.

Note: The unusually heavy construction, and the extreme care with which all material is selected and fitted, give this power exceptional strength and reliability.

(SE-1) Work Included

Note: List and locate. (See Paragraph 10, Fenestra Page 2).

(SE-2) General

All continuous window operators shall be Fenestra Continuous Operators as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(SE-3) Material

(SE-3a) Power—Power shall consist of a case hardened, machine cut, high carbon steel worm operating a special alloy, non-ferrous bronze, worm gear with straight face, machine cut teeth and extra heavy hub and rim.

Worm and gear shall be oil-encased, assembled in an accurately machined, oil-tight box. Worm and worm shaft shall be turned down from a solid steel bar. The worm shaft shall be made with long radial bearing surfaces and shall be provided with ball thrust, friction reducing bearings.

Note: The unusual length of the worm shaft radial bearing surfaces assures gear alignment and ease of operation without binding.

The worm gear shall fit tightly over a 1" squared, steel shaft which shall extend to drive a high carbon steel, heat treated pinion in mesh with a rack.

Worm gear and pinion shall be separated by a spacer and all three shall be broached out to accurately fit the shaft with the permanence and reliability of a single piece.

The rack shall be of high carbon steel with machine-cut teeth of stub tooth design. The rack shall be suspended at each end from the power transmission tension line, by rigid rack hangers which thrust against clamps securely attached to the line, thus transmitting the power in a horizontal direction.

Note: The length of runs which may be operated from a single power can only be determined by consultation with a Fenestra representative since numerous factors must be considered, such as: the type of windows (top hung, bottom hung, etc.), their location (vertical or horizontal plane), their height, the degree of opening desired, the time permitted for opening or closing, and, if manually operated, the effort to be exerted on the chain.

(tension) line shall be 1" black, wrought iron pipe in lengths not to exceed 20', joined into a continuous line by solid steel plugs, with a drive fit, riveted in two directions.

Tension line shall be supported on 2"x3" steel angle brackets with legs turned down, spaced approximately 10' apart and rigidly attached to the building construction.

Brackets shall be slotted to permit adjustment and shall carry at their upper, outer ends, cast iron roller housings and solid steel rollers to support the tension line.

(SE-3e) Operating Arms—Operating arms or levers shall be steel angles consisting of two arms, one twice as long as the other.

Note: The operating arm assemblies are spaced in conjunction with the tension line brackets, approximately 10' apart.

One end of the long arm shall be rigidly clamped through a universal pivoted joint, to the tension line and the other end shall be secured to the window through a universal pivoted joint bracket. One end of the short arm shall be attached through a universal pivoted joint to the top of the cast iron roller housing on the tension line support bracket, the other end being pivoted to the center of the long arm.

All universal joints shall be provided with bronze bushings.

(SE-3f) Manual Operation—Power shall be operated by a chain operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the extended, flattened end of the worm shaft and shall be secured by a set screw, a cotter pin through the end of the shaft providing additional protection.

Note: To clear obstructions or make the windows visible from the operating station, chain may be carried over idlers to any convenient point.

(SE-3g) Electrical Operation—Power shall be operated by an electrical power unit operating through a sprocket and chain. Hub of sprocket shall be keyed to the extended end of the worm shaft. Electrical power unit shall be mounted beneath and secured to the power by rigidly attached auxiliary steel brackets.

Note: Complete specifications of Electrical Equipment given on Fenestra Page 35, should be included here.

(SE-4) Painting

All operators shall be painted one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 3, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specifications for paint and its application.

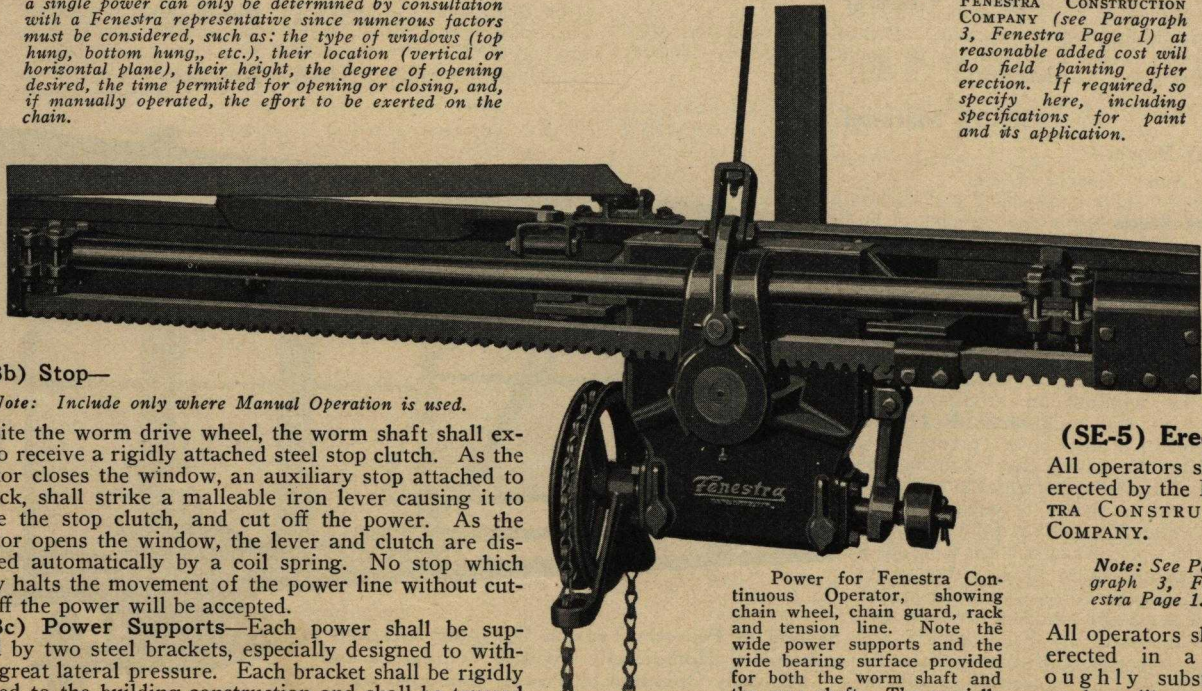
(SE-3b) Stop—

Note: Include only where Manual Operation is used.

Opposite the worm drive wheel, the worm shaft shall extend to receive a rigidly attached steel stop clutch. As the operator closes the window, an auxiliary stop attached to the rack, shall strike a malleable iron lever causing it to engage the stop clutch, and cut off the power. As the operator opens the window, the lever and clutch are disengaged automatically by a coil spring. No stop which merely halts the movement of the power line without cutting off the power will be accepted.

(SE-3c) Power Supports—Each power shall be supported by two steel brackets, especially designed to withstand great lateral pressure. Each bracket shall be rigidly attached to the building construction and shall be trussed with ½" tension rods with adjusting U bolt hangers.

(SE-3d) Power Transmission—Power transmission



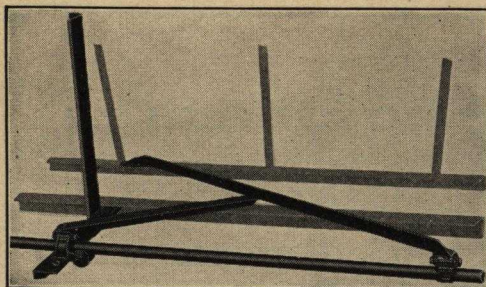
Power for Fenestra Continuous Operator, showing chain wheel, chain guard, rack and tension line. Note the wide power supports and the wide bearing surface provided for both the worm shaft and the gear shaft. The specially designed Fenestra stop is shown on the worm shaft at the opposite end from the chain wheel

(SE-5) Erection

All operators shall be erected by the FENESTRA CONSTRUCTION COMPANY.

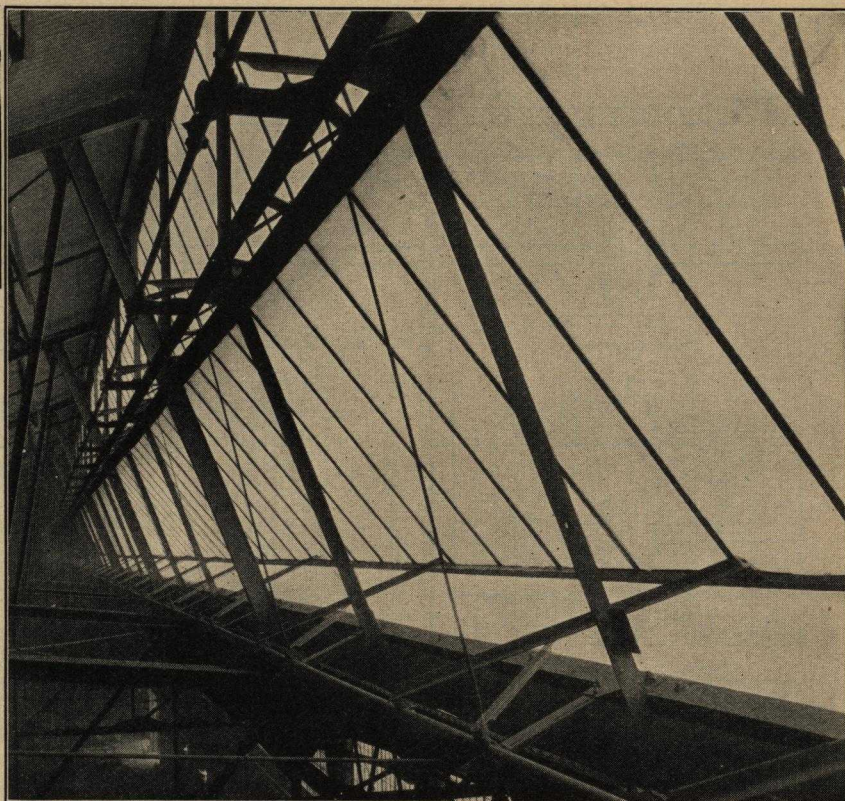
Note: See Paragraph 3, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.



Above is shown a "close up" of the power transmission on Fenestra Continuous Operator. Note the 2x3 in. steel angle bracket supporting the line; the two operating arms, one twice as long as the other: one end of the long arm clamped to the pipe through a universal joint and the other attached to the window. The short arm is attached to the top of the cast iron roller housing while the other end is pivoted to the center of the long arm. For detailed description, see Paragraph SE-3e, Fenestra Page 34

At the right is shown part of two runs of Fenestra Continuous Operator as installed in the plant of the Commonwealth Steel Co., Granite City, Ill. The upper run of windows is closed while the lower run is partially open. This picture illustrates very well the operation of long runs of continuous top hung windows from a single power



CONTINUOUS WINDOW OPERATOR (CABLE TYPE)

Note: This operator is primarily adapted to use on Continuous Top Hung Windows.

The operator is designed for either hand or electrical operation and is identical to the continuous window mechanical operator except in one respect. Both ends of the transmission line are connected to chains which pass over roller bearing idlers rigidly supported on steel idler brackets (guys to the building construction where possible) and are attached to continuous steel rods. The steel rods are carried directly beneath the transmission tension line and are supported

through holes in the tension line brackets. The ends of the steel rods next the power are connected to either end of the power rack. The proper tension in rods is accomplished through turn buckles furnished in the rod lines. In this operator the transmission line (the 1" pipe) is always in tension both when opening and closing the windows. For details, see Fenestra Page 44.

(SF) ELECTRICAL EQUIPMENT FOR OPERATORS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(SF-1) Work Included

Note: List and locate. See Paragraph 10, Fenestra Page 2.

(SF-2) General

All Mechanical Operators, electrically controlled, shall be provided by the Operator Manufacturer, with complete electrical equipment, as hereinafter specified. The operator manufacturer shall provide complete wiring diagrams.

(SF-3) Electrical Equipment

(SF-3a) Motors—Motors shall be of type best adapted to the power equipment, of high torque and ample horsepower.

Note: Motors operating on 220 volt or 440 volt, 60 cycle, 3 phase alternating current are recommended. Direct current motors are not carried in stock, but if alternating current is not available, a special motor for 230 volt, direct current, can be supplied.

Note: Specify current furnished.

(SF-3b) Power Connections—Motors shall be connected to power by means of sprockets and chains, or direct connected through universal joints as best adapted to power requirements.

(SF-3c) Reversing Switches—Standard Magnetic Reversing Switches shall be enclosed in steel boxes and so designed, that the movement of the ventilator, either in opening or closing may be stopped or started at any point by manipulation of push buttons.

(SF-3d) Limit Switches—Limit Switches shall be positive in action and rigidly attached to the power to form an integral part of the power unit. All limit switches shall be enclosed,

yet accessible for adjustment so as to positively limit the motion of the ventilator in either direction.

(SF-3e) Push Button Stations—Push Button Stations "open," "close" and "stop" shall be of rugged construction to withstand hard usage. Buttons shall be recessed in cover so that they cannot be accidentally operated.

(SF-4) Electrical Construction

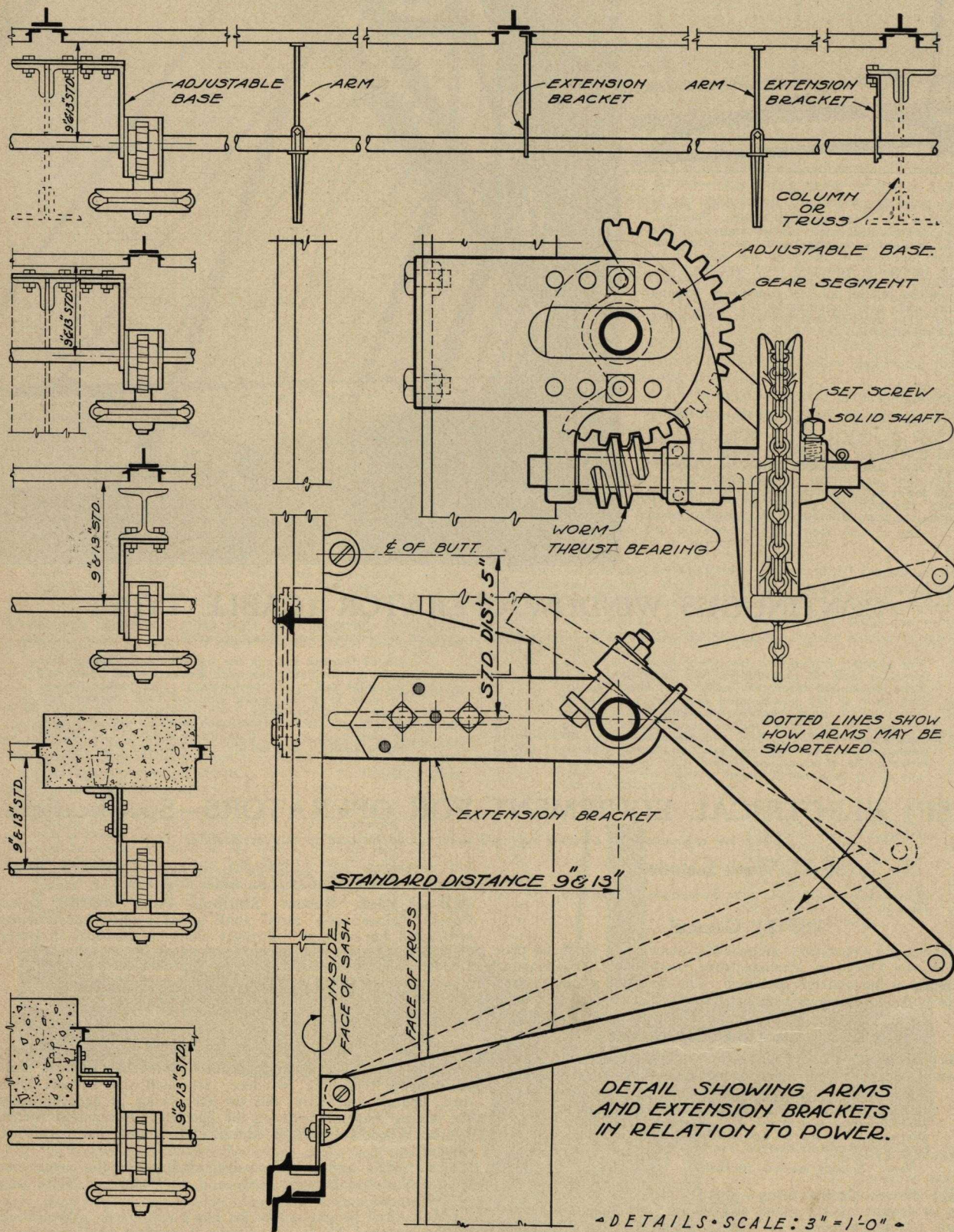
Note: The following provisions should be made in the Electrical Specifications.

The Electrical Contractor shall install magnetic reversing switches and push button stations and shall furnish and install safety type, line switches. He shall also furnish all conduit, fittings and wire and do all wiring in accordance with the wiring diagram between the Electrical Equipment furnished by the Window Operator Manufacturer and that furnished by himself.

All materials and workmanship shall meet the requirements of the National Electric Code and all Local and State Inspection Bureaus.

Conduit shall be galvanized or black enameled. Wire shall be rubber covered N. E. C. Exposed conduit shall be run in a systematic, slightly manner, parallel with structural features of the building and rigidly and neatly secured. Where walls are plastered, conduit shall be concealed.

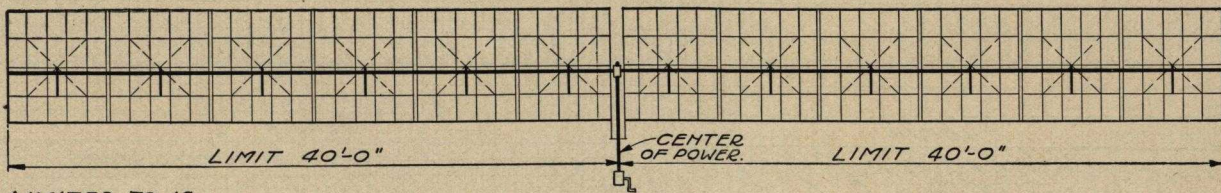
The Electrical Contractor shall carry fire, workmen's compensation, and public liability insurance. He shall guarantee his work for a period of one year after completion. Defects in the work and material furnished by him, developing during the above named period shall be promptly and satisfactorily made good at his expense.



Fenestra
August 1929

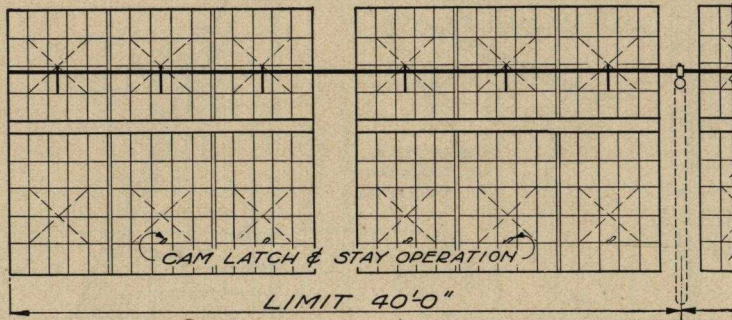
*Worm and Gear Operator
Typical Details*

Plate No
S-101



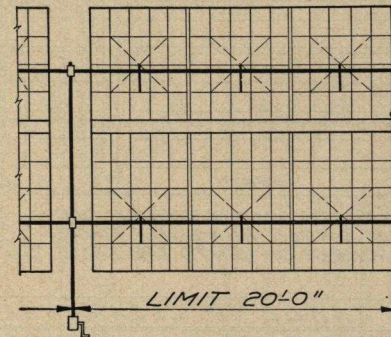
LIMITED TO 12
STANDARD 2
PANE HIGH VENTS.

TYPICAL SINGLE RUN



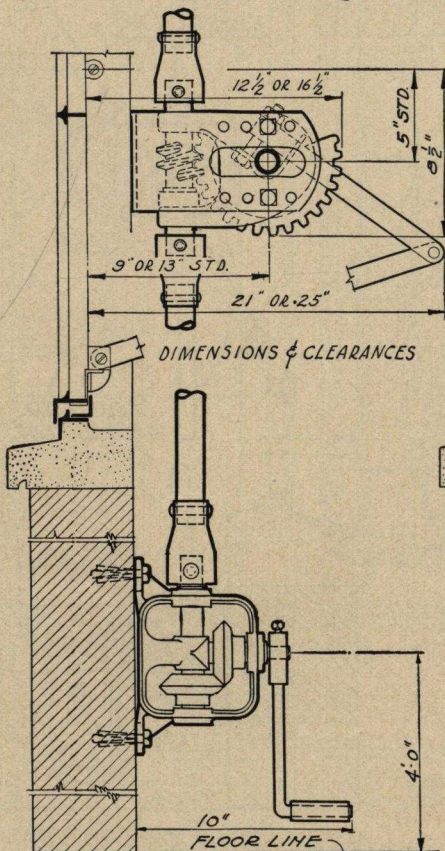
LIMITED TO 12
STANDARD 2
PANE HIGH VENTS.

TYPICAL SINGLE RUN

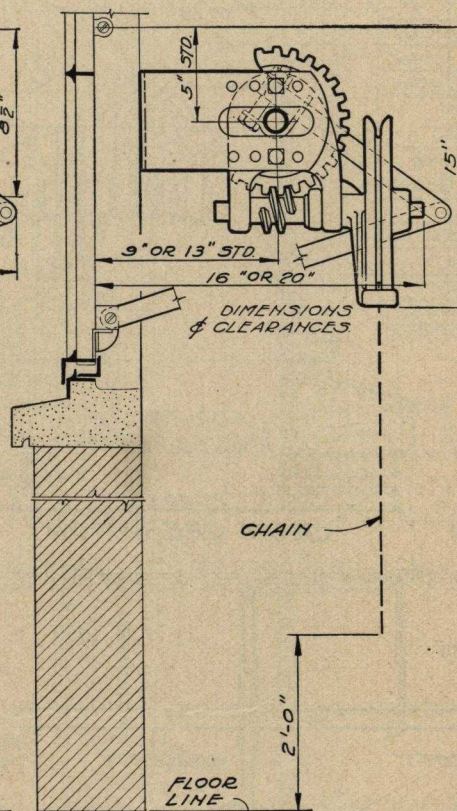


LIMITED TO 12
STANDARD 2
PANE HIGH VENTS

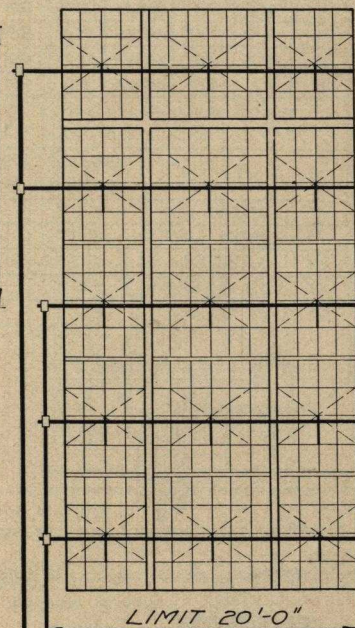
TYPICAL DOUBLE RUN



MITER GEAR OPERATION



CHAIN OPERATION



LIMITED TO 9 STANDARD
2 PANE HIGH VENTS
FOR EACH MITER
GEAR CONTROL.

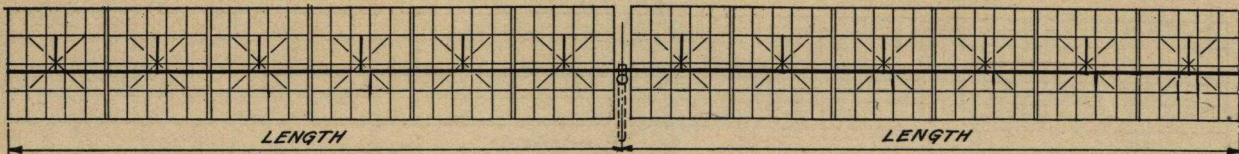
TYPICAL MULTIPLE RUNS
OPERATED IN SINGLE BAYS.

• DETAILS • SCALE: 1/2" = 1'-0" •

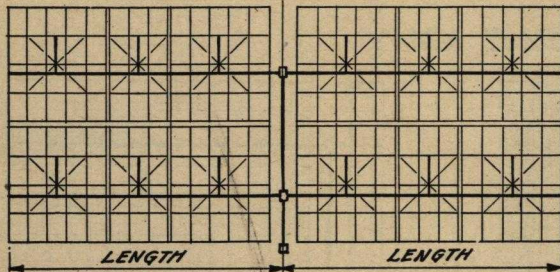
Fenestra
August 1929

**Worm and Gear Operator
Bay Operation**

Plate No
S-102



LIMITED EACH SIDE TO 80' AND 12 HOR. PIVOTED VENTS OR 40' AND 6 TOP PIVOTED VENTS
TYPICAL SINGLE RUN.



LENGTH LIMITED TO HALF THAT OF SINGLE RUNS WITH TOTAL NUMBER OF VENTS THE SAME. DOUBLE RUN

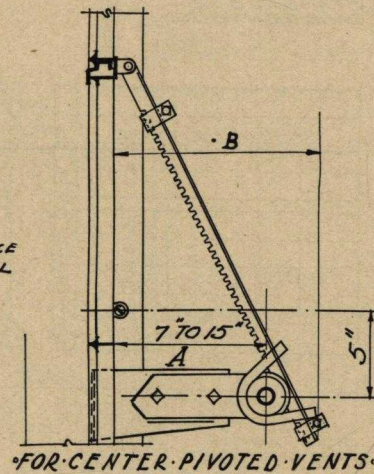
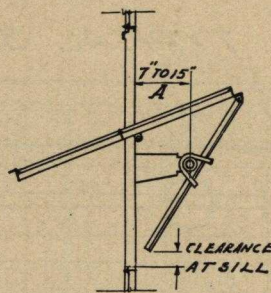
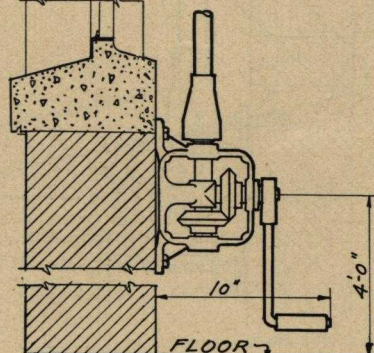
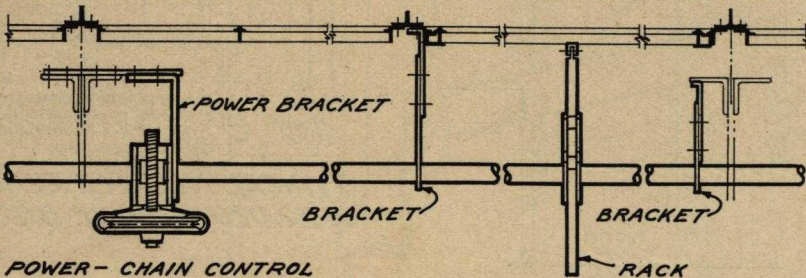
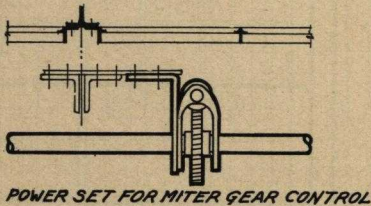
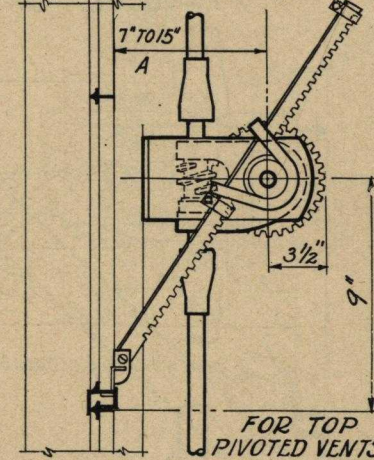
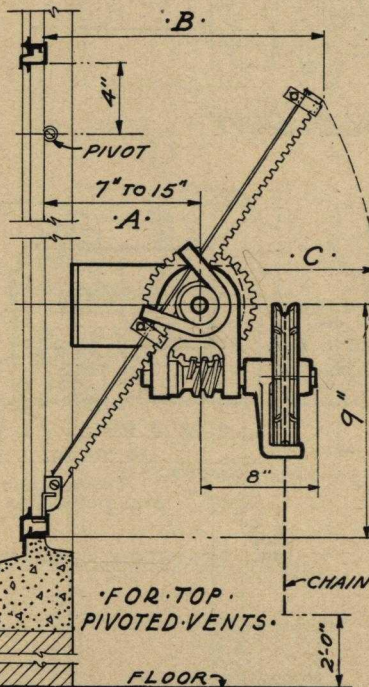
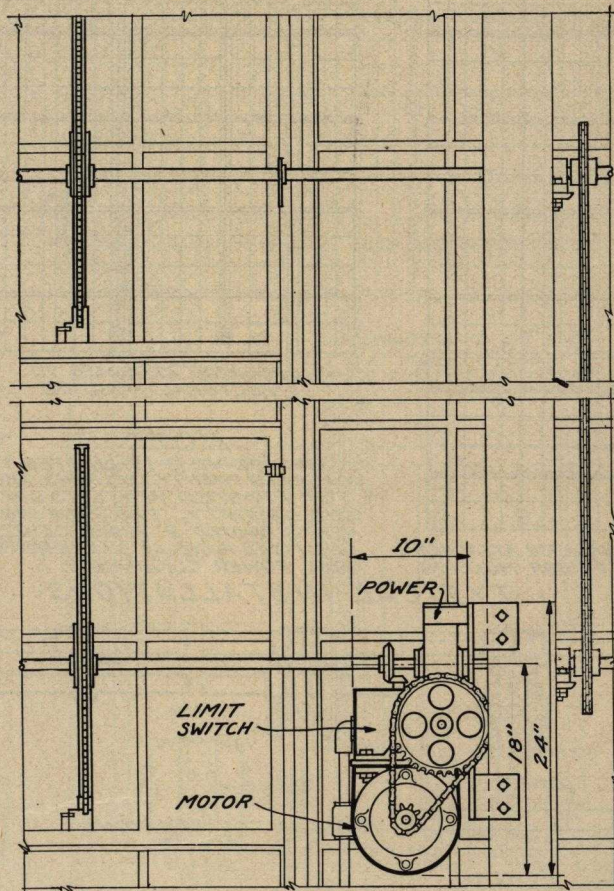
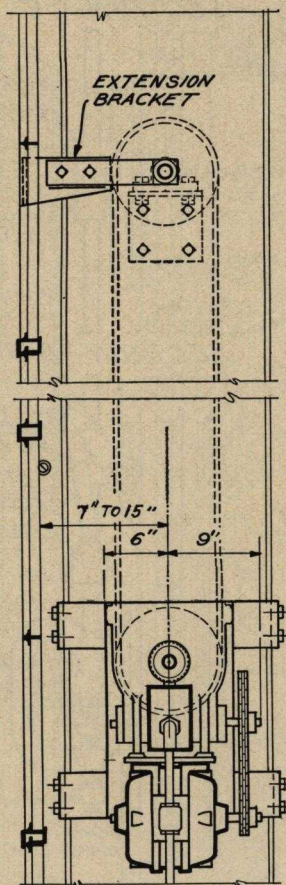
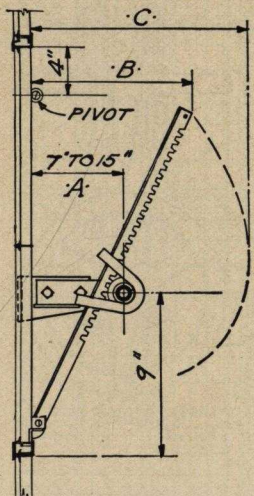
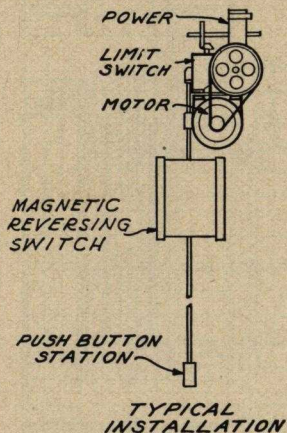
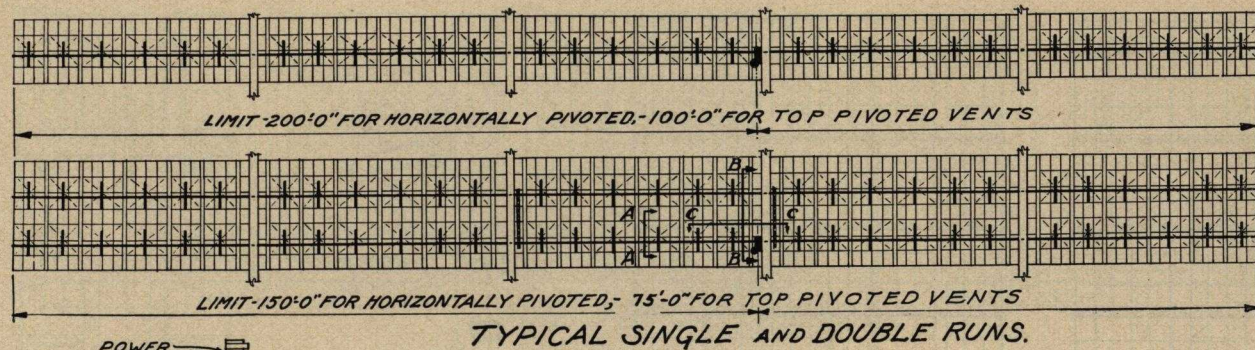


TABLE OF CLEARANCES							
TWO PANE HIGH VENTILATORS PIVOTED 2" ABOVE CENTER							
18" GLASS				20" GLASS			
A	B	ANGLE OPNG. AT SILL	CLEARANCE AT SILL	B	ANGLE OPNG. AT SILL	CLEARANCE AT SILL	
7	12	60°	NONE	11	90°	3"	
9	14½	70°	NONE	13½	90°	1"	
11	16½	80°	NONE	15½	80°	NONE	
13	18½	90°	NONE	17½	90°	NONE	
15	21	90°	NONE	20	90°	NONE	
TWO PANE HIGH TOP PIVOTED VENTILATORS							
A	B	C	ANGLE OF OPENING				
			18" GLASS	20" GLASS			
7	24½	28	60°	50°			
9	29½	30	60°	50°			
11	31½	31	50°	50°			
13	33½	33	50°	40°			
15	35½	35	40°	40°			

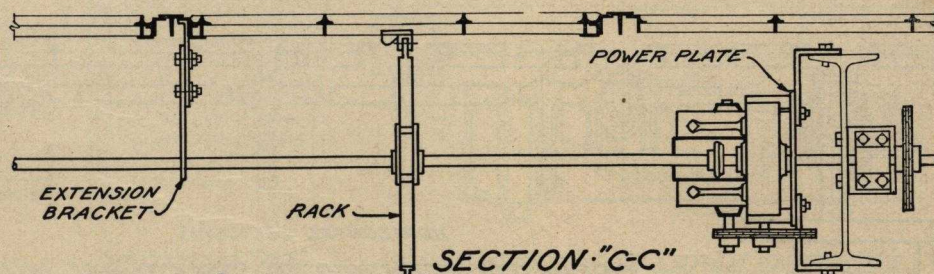


DETAILS SCALE: ¾" = 1'-0"



CLEARANCES FOR RACK TWO PANE HIGHTOP PIVOTED VENTS.

A	B	C	OPENING ANGLE	
			15° GLASS	20° GLASS
7	24½	28	60°	50°
9	29½	30	60°	50°
11	31½	31	50°	50°
13	33½	33	50°	40°
15	35½	35	40°	40°

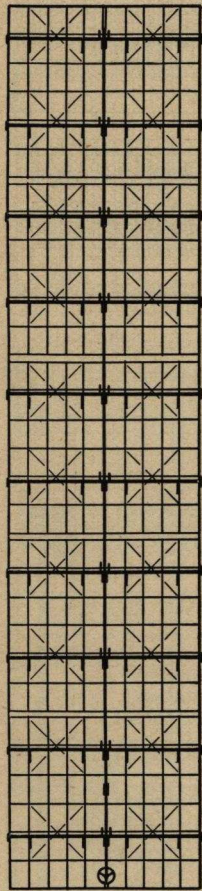


• SCALE: ¾" = 1'-0" •

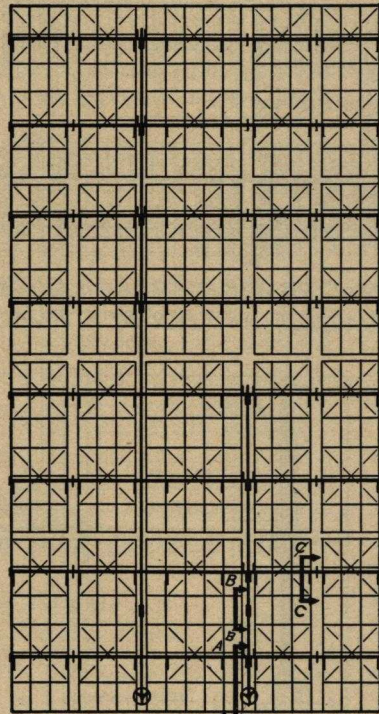
Fenestra
August 1929

Rack and Pinion Operator
Electrically Controlled

Plate No
S-202



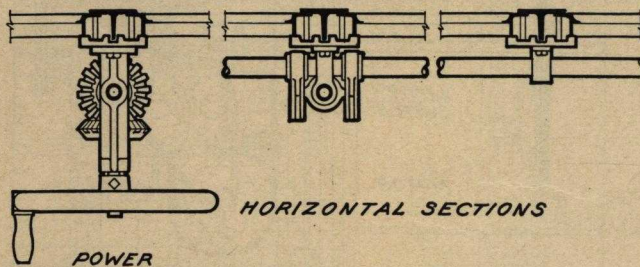
OPERATOR ATTACHED TO T-BAR MULLION



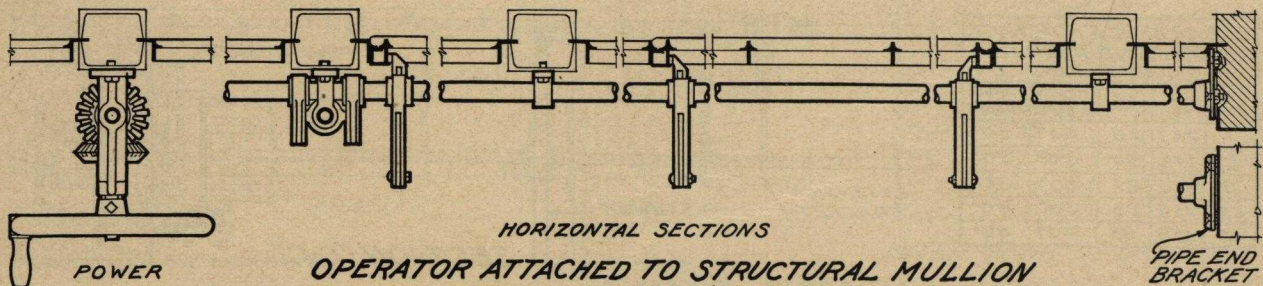
OPERATOR ATTACHED TO STRUCTURAL MULLION

NOTE.
ONE POWER IS LIMITED TO OPERATE TWENTY TWO PANE HIGH TOP PIVOTED VENTS TO OPEN OUT; OR FIFTY TWO PANE HIGH VENTS PIVOTED 2" ABOVE CENTER. ONE FIXED PANE AT SILL REQUIRED FOR POWER CLEARANCE.

TYPICAL INSTALLATIONS.

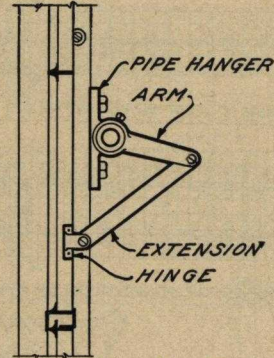


POWER
OPERATOR ATTACHED TO T-BAR MULLION

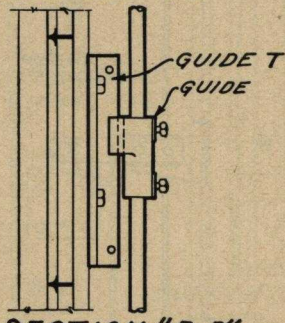


OPERATOR ATTACHED TO STRUCTURAL MULLION

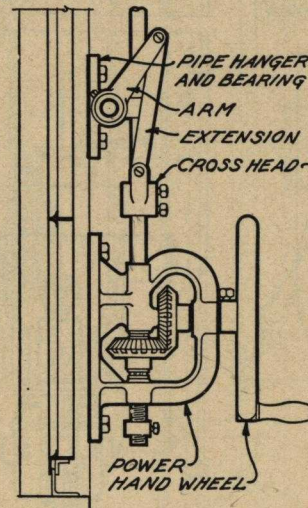
SCALE: 1/2" = 1'-0"



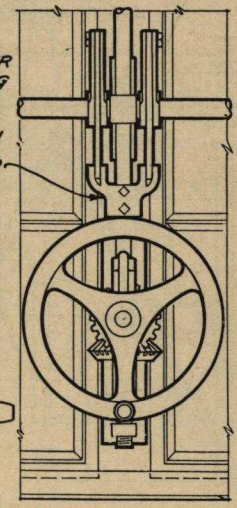
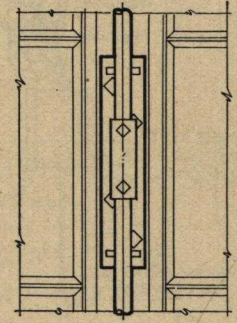
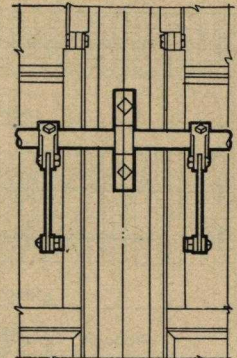
SECTION "C-C"



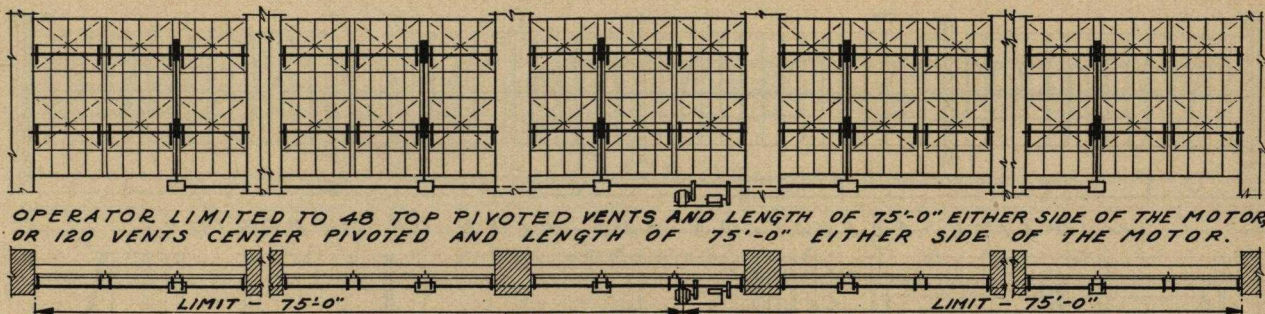
SECTION "B-B"



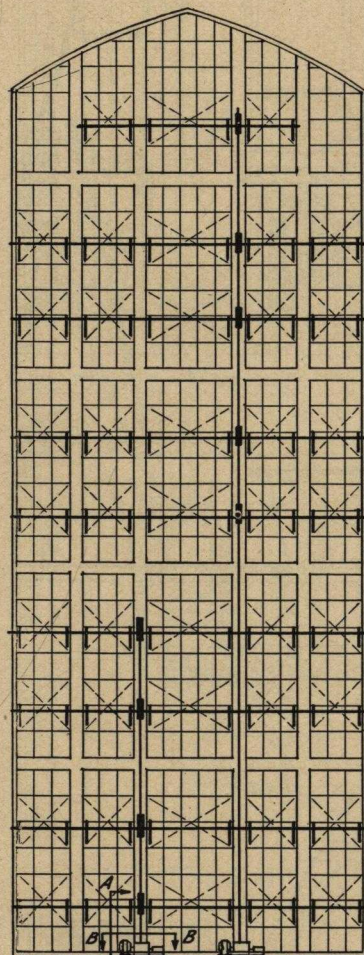
SECTION "A-A"



ELEVATION

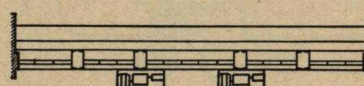


MULTIPLE BAY OPERATION

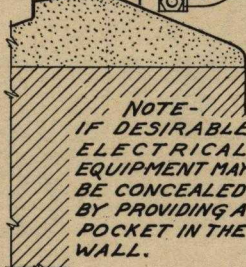
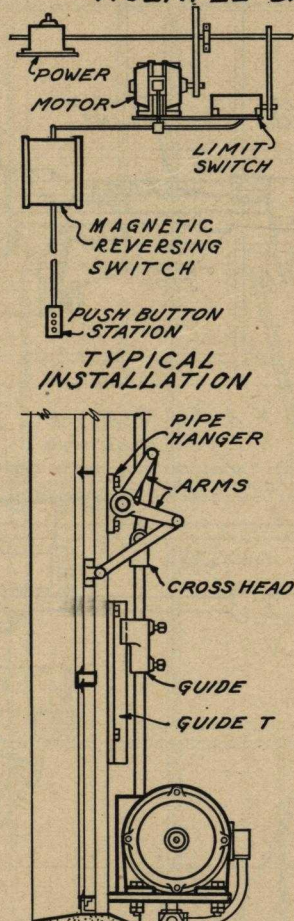


SINGLE BAY OPERATION

OPERATOR LIMITED TO 8 TIERS AND 24 TOP PIVOTED VENTS OR 8 TIERS & 48 VENTS CENTER PIVOTED.

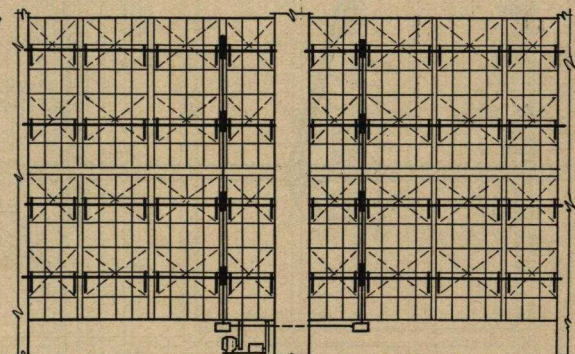


PLAN

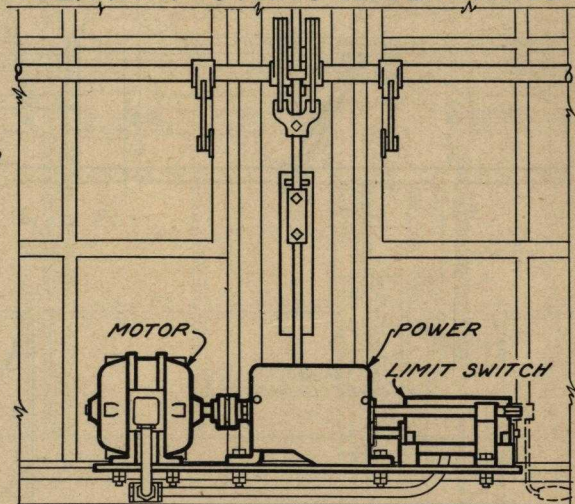


SECTION "AA"

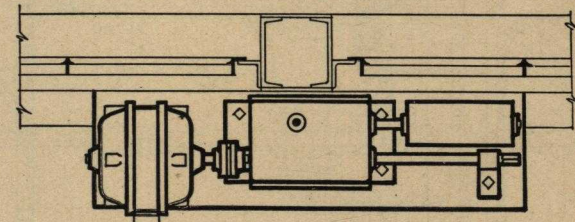
SCALE: 3/4" = 1'-0"



2 BAY OPERATION EACH BAY LIMITED TO 24 TOP PIVOTED VENTS OR TO 48 VENTS CENTER PIVOTED.



POWER FOR LARGE OPENINGS

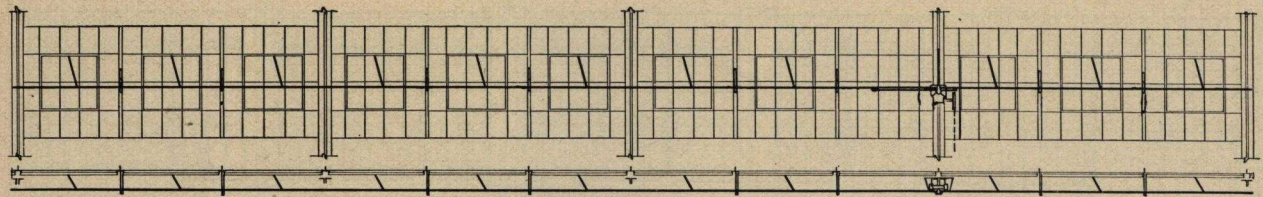


PLAN-POWER FOR LARGE OPENINGS.

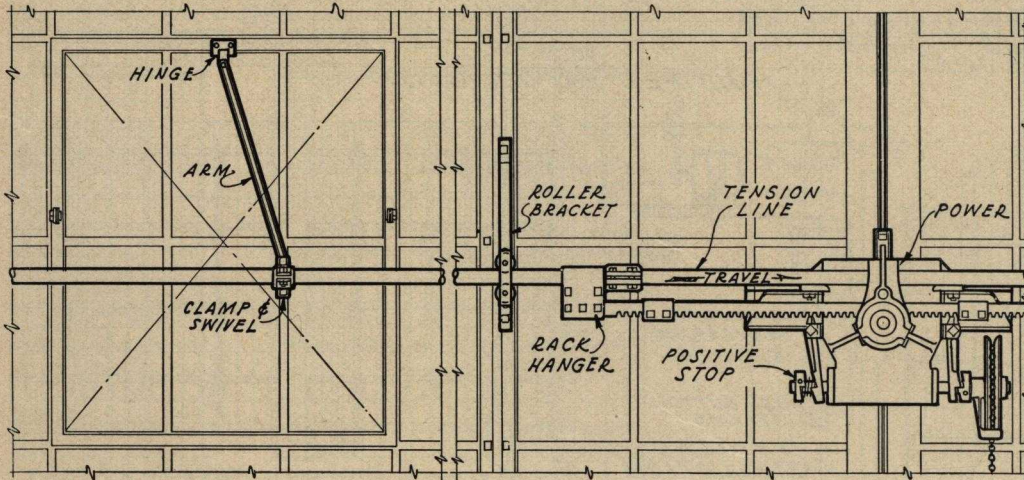
Fenestra
August 1929

Screw Type Operator
Electrically Controlled

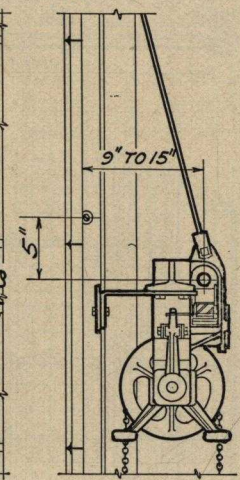
Plate No
S-302



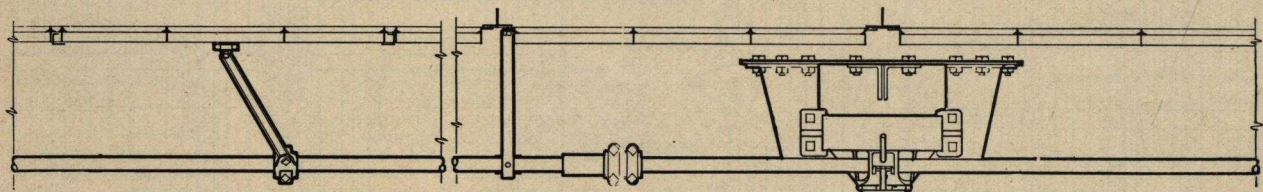
• INSIDE • ELEVATION • AND • PLAN • OF • OPERATOR •



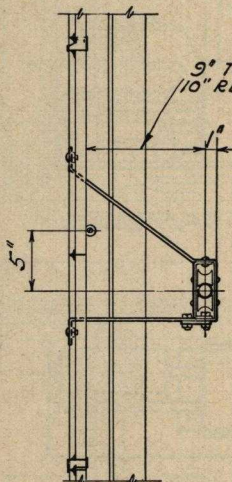
• INSIDE • ELEVATION •



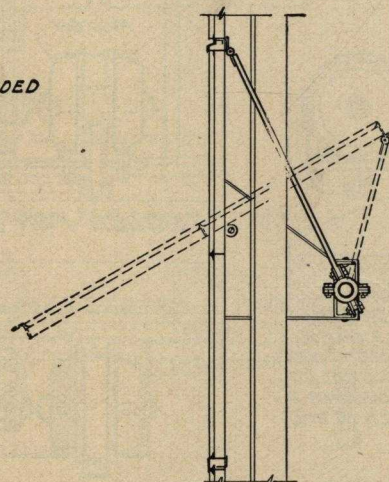
• SECTION •



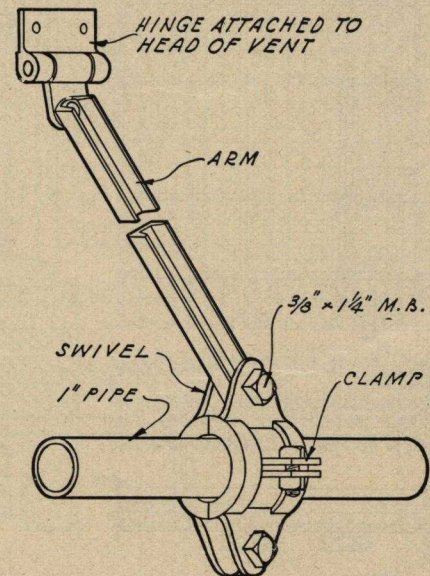
• P L A N •



• DETAIL • AT •
ROLLER • BRACKET •

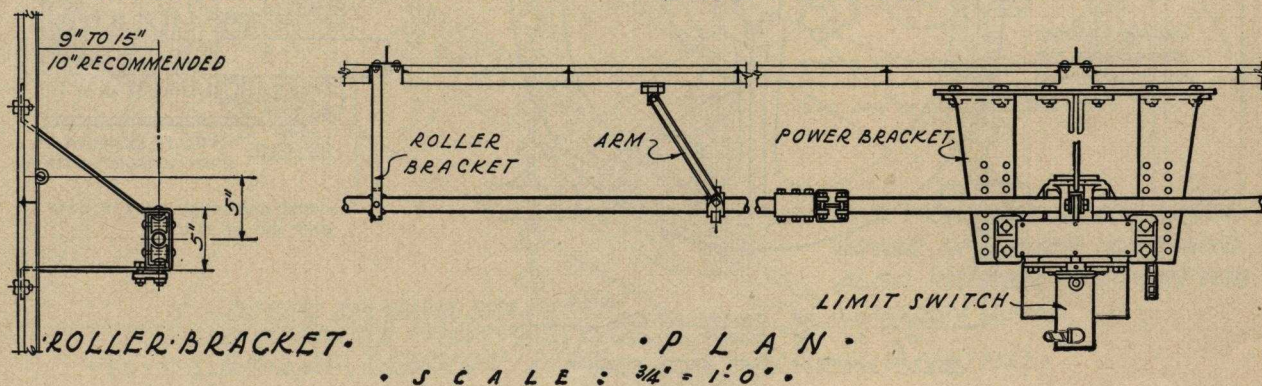
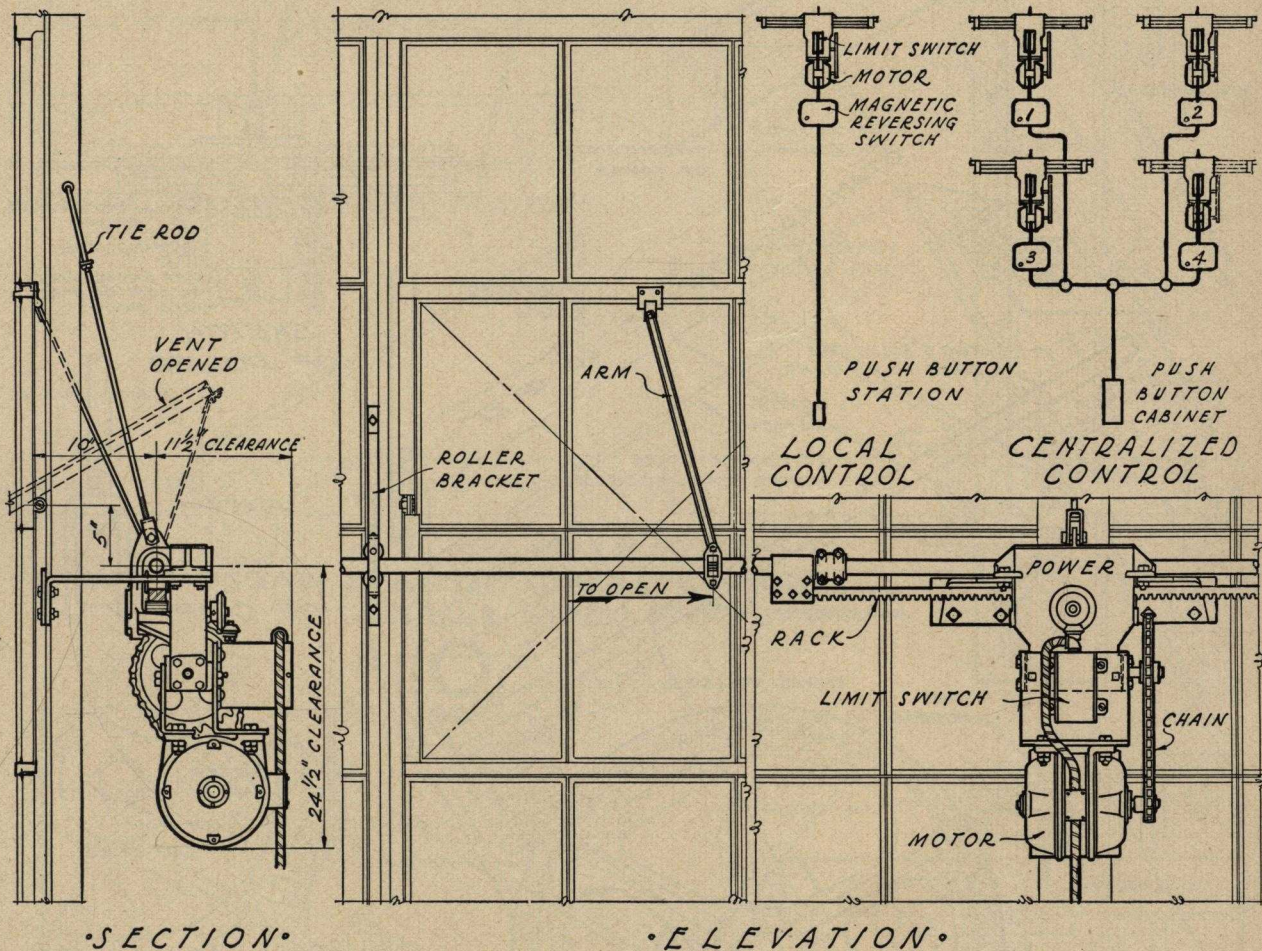
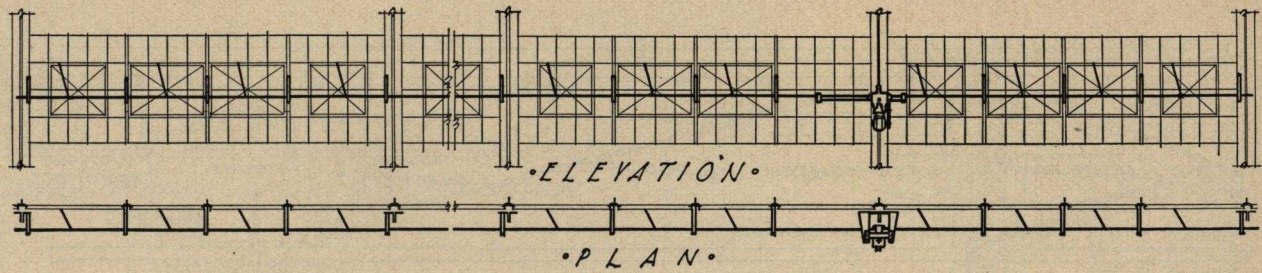


• DETAIL •
AT • ARM •



• DETAIL • OF • SWIVEL •

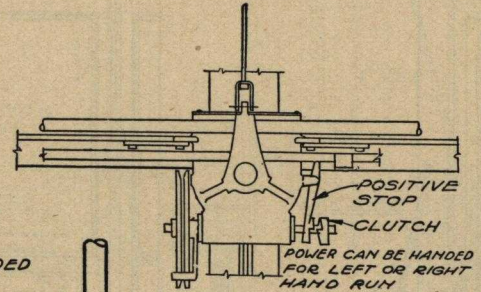
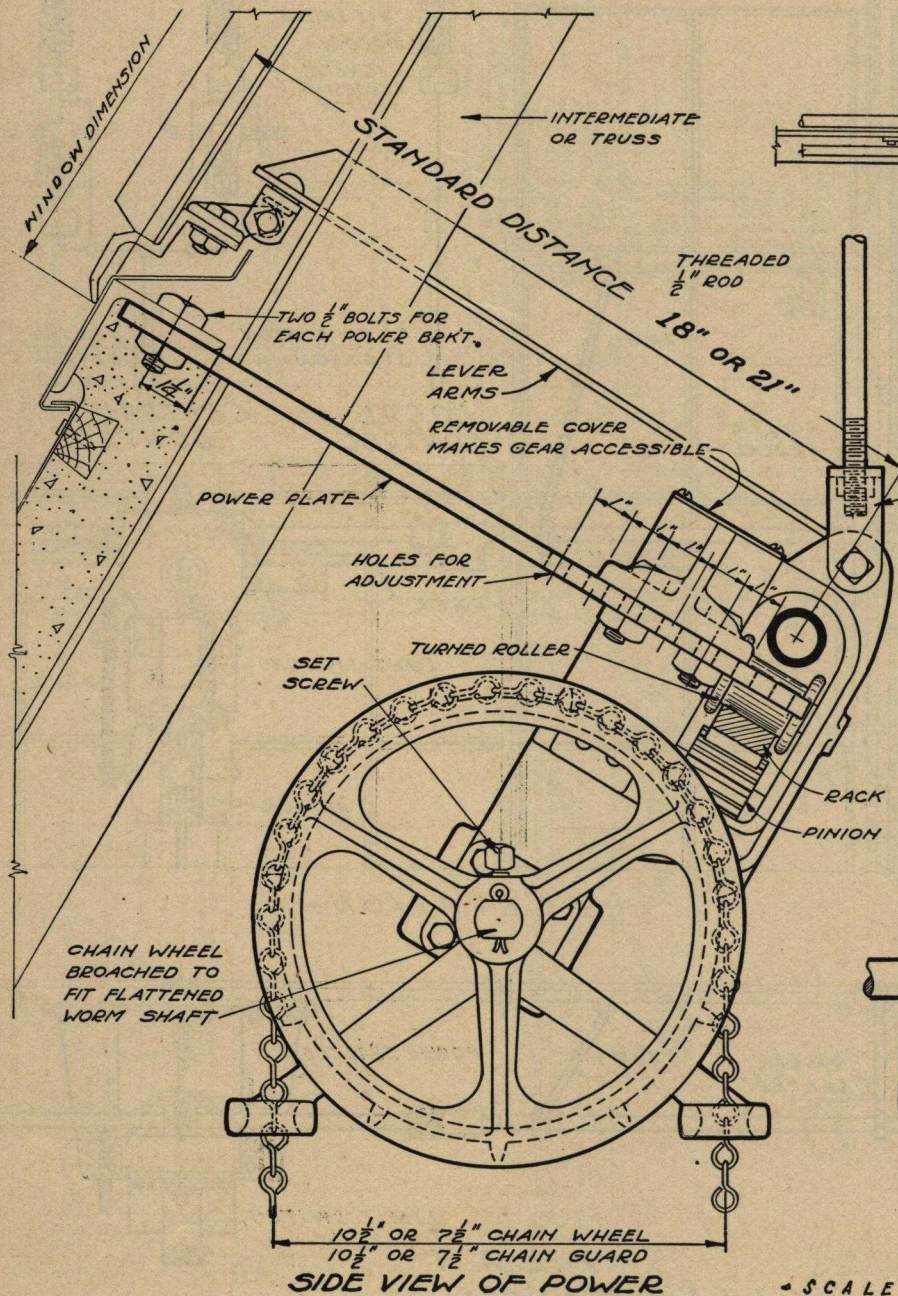
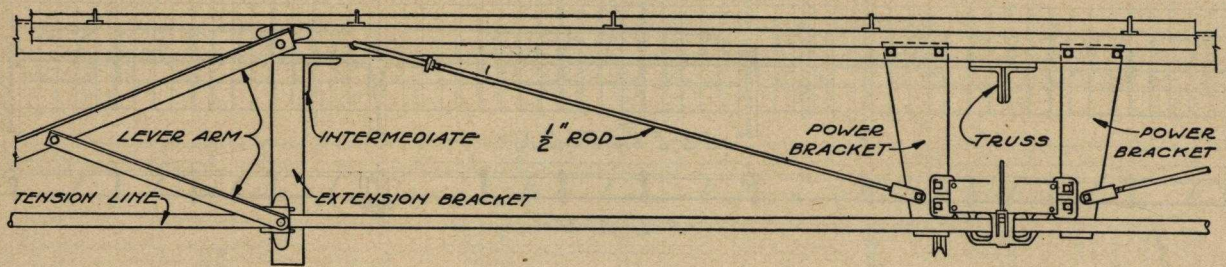
• SCALE : $\frac{3}{4}$ " = 1'-0" •



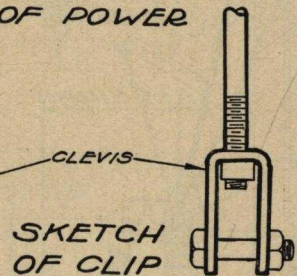
Fenestra
August 1929

Tension Type Operator
Electrically Controlled

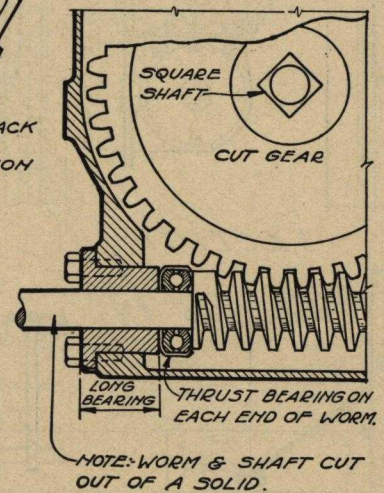
Plate No
S-402



SKETCH OF POWER



SKETCH OF CLIP

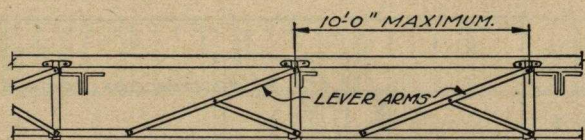


• SCALE: HALF • FULL • SIZE •

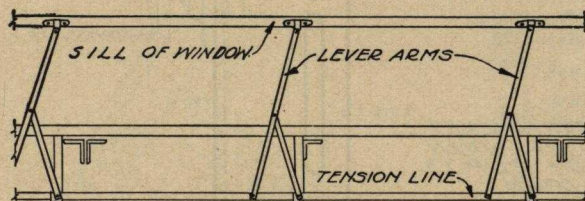
Fenestra
August 1929

Continuous Type Operator
Typical Details

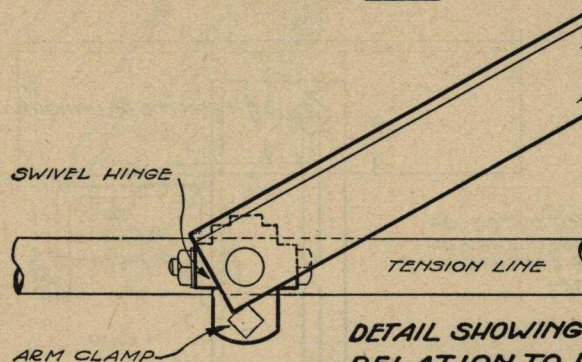
Plate No
S-501



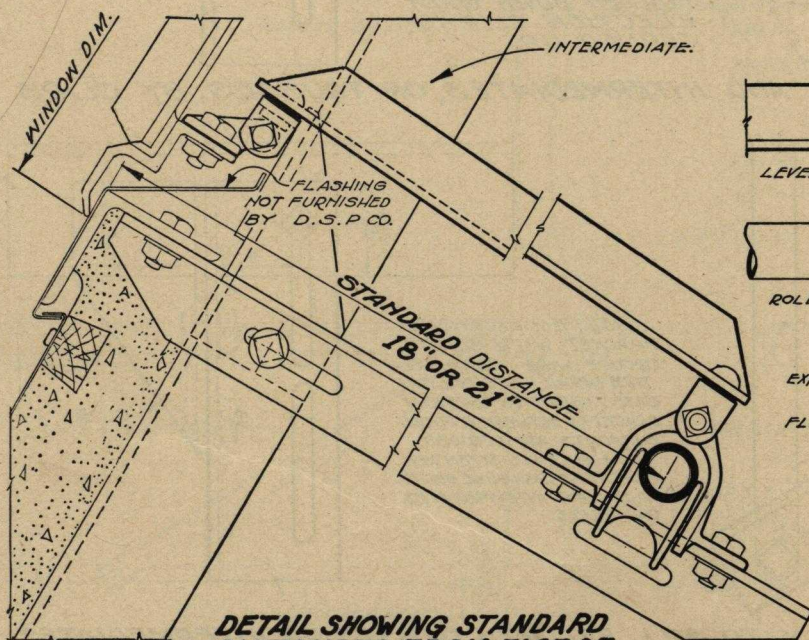
DETAIL OF LEVER ARMS IN CLOSED POSITION



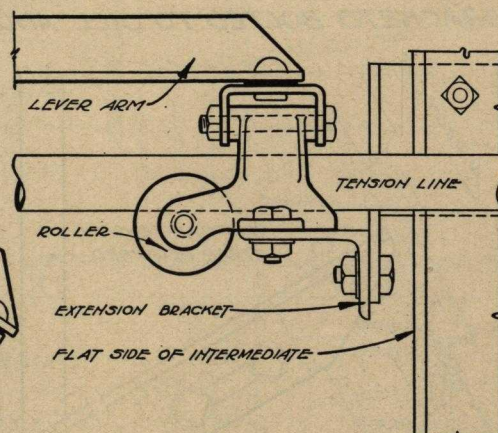
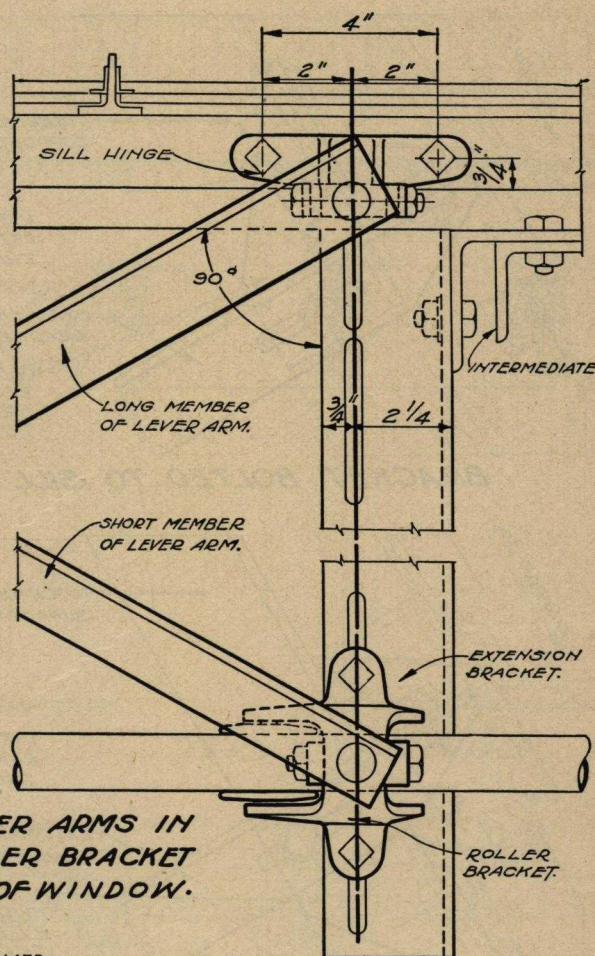
DETAIL OF LEVER ARMS IN OPEN POSITION.



DETAIL SHOWING LEVER ARMS IN
RELATION TO ROLLER BRACKET
AND SILL HINGE OF WINDOW.

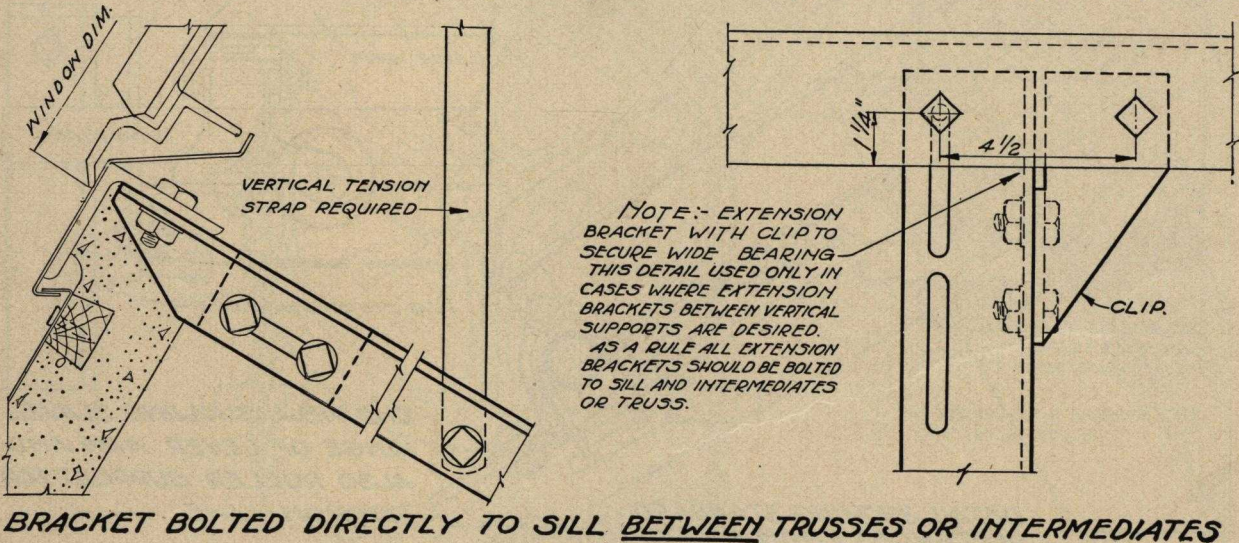
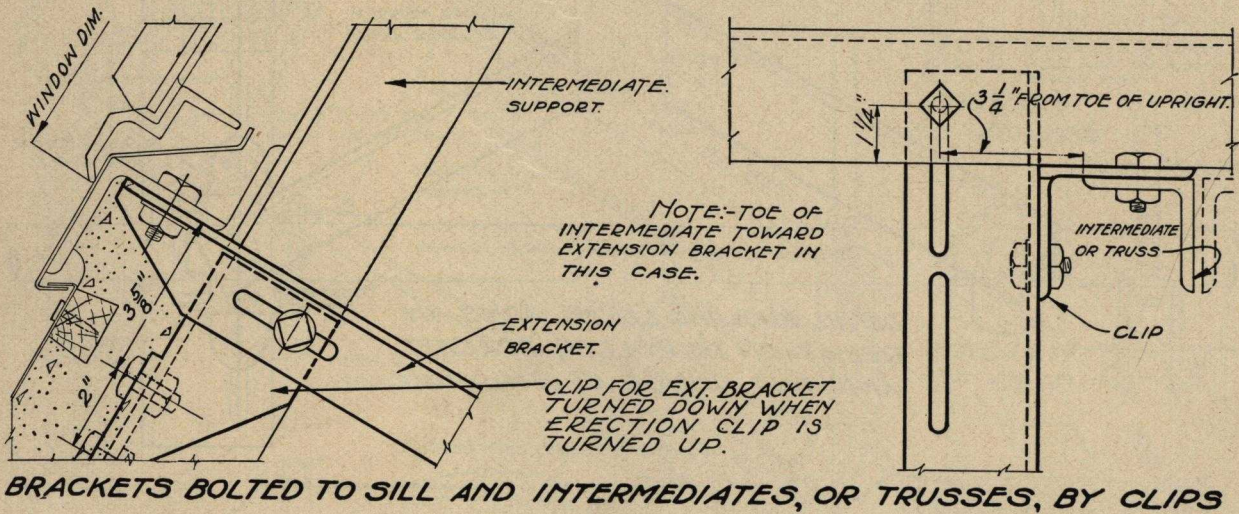
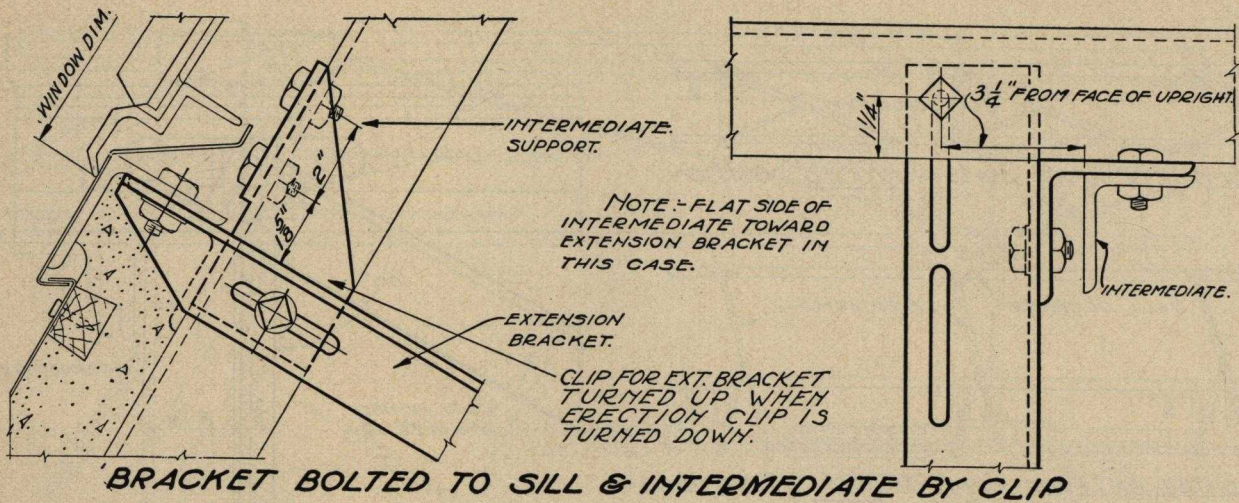


DETAIL SHOWING STANDARD
DISTANCES FROM FACE OF
SILL TO TENSION LINE

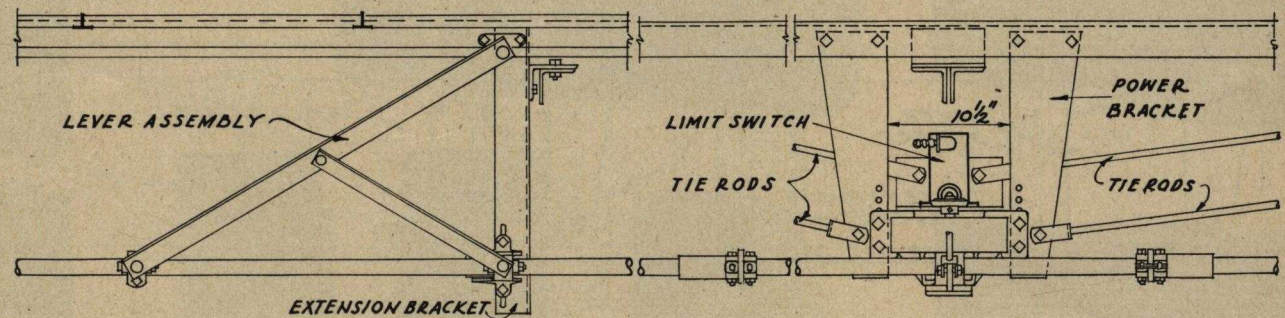
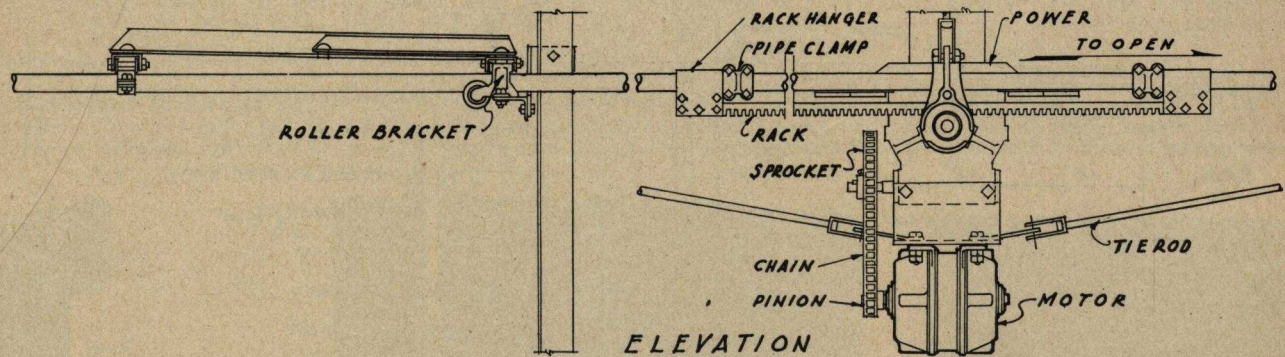
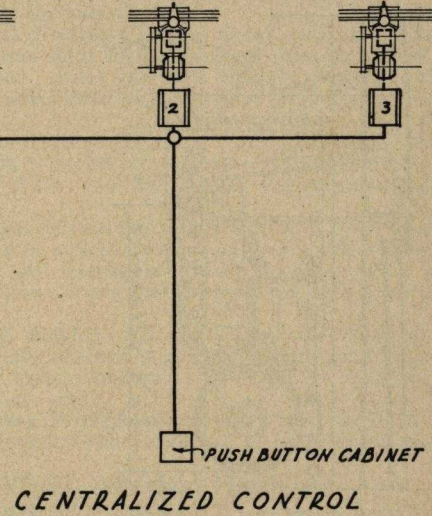
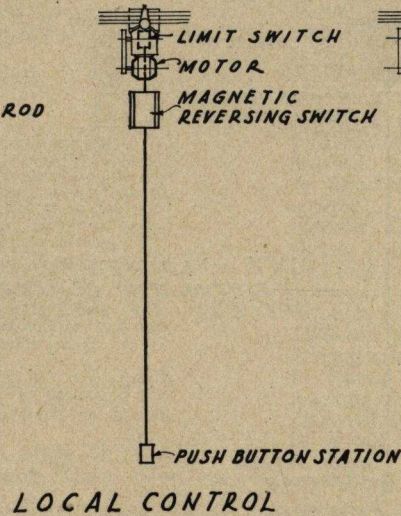
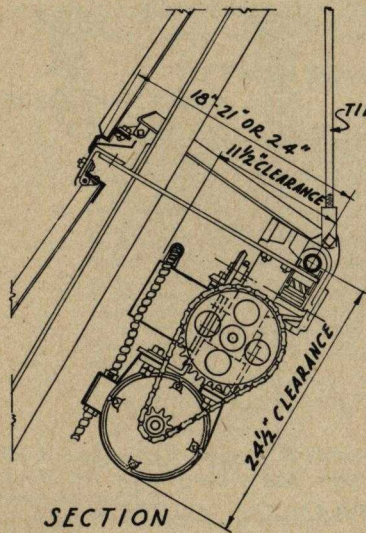
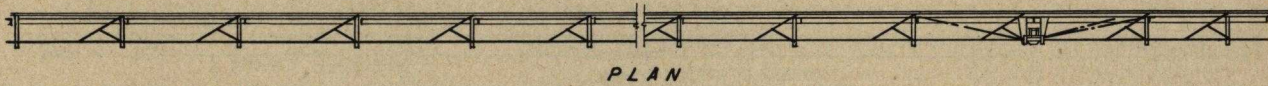
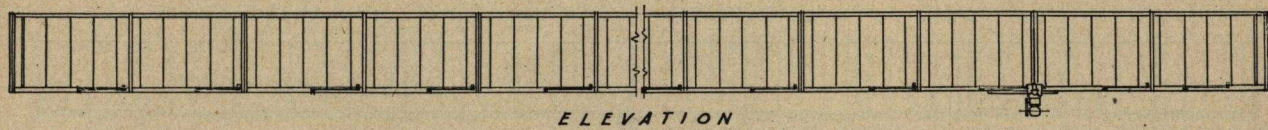


END VIEW SHOWING SWIVEL
HINGE OF LEVER ARM AND
ALSO ROLLER SUPPORT FOR
TENSION LINE.

•SCALE: HALF-FULL-SIZE•



• SCALE: HALF-FULL-SIZE •

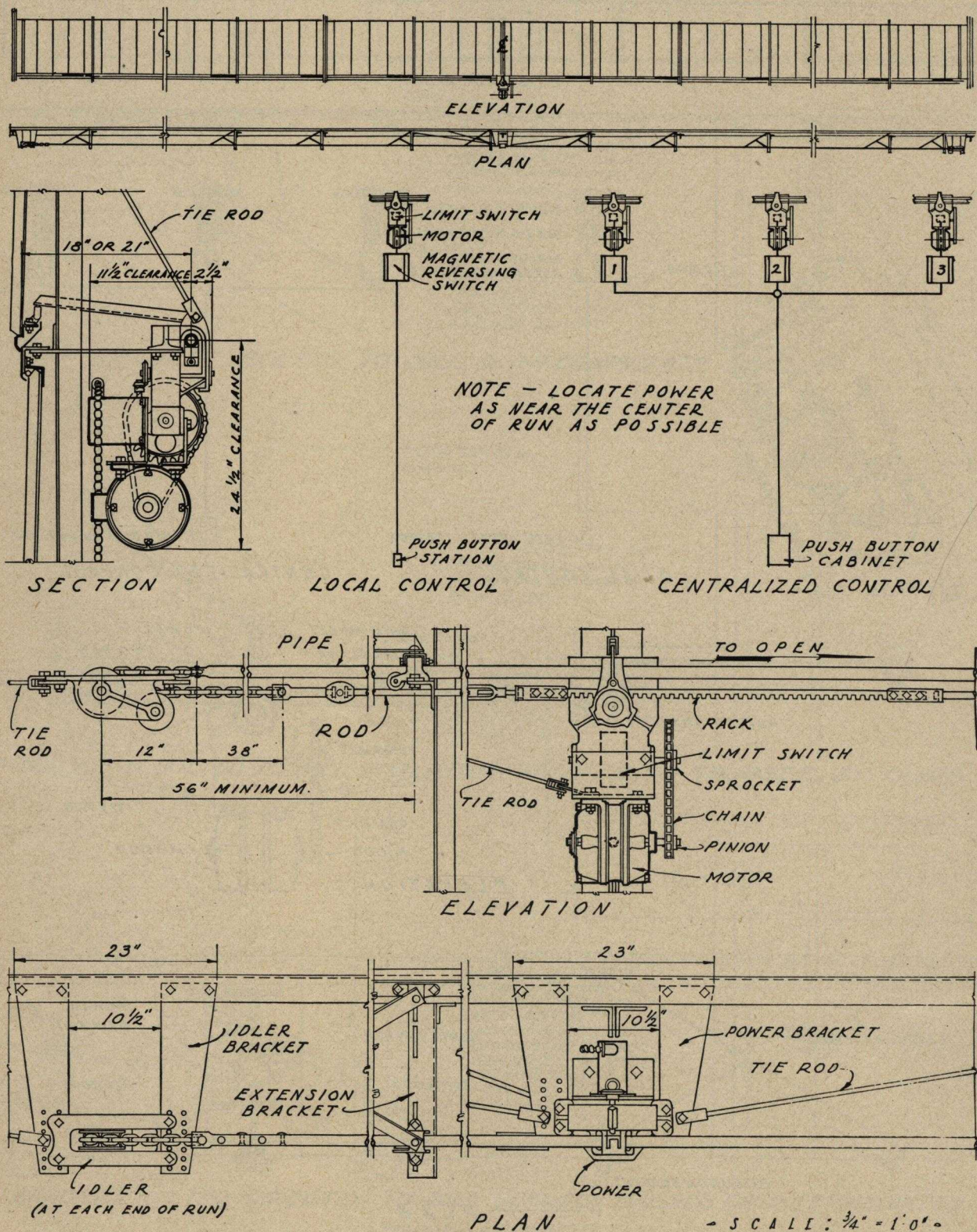


SCALE: 3/4" = 1'-0"

Fenestra
August 1929

Continuous Type Operator
Electrically Controlled

Plate No
S-504



(YS) SWINGING AND SLIDING STEEL DOORS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Both Channel and Tubular doors are made to swing or slide and in single and double units. Specify as required.

(YS-1) Work Included

Note: List and locate. See Paragraph 10, Fenestra Page 2.

Note: In lists or schedules, indicate whether swing doors open "In" or "Out" and which jamb carries the hinges.

(YS-2) General

All doors shall be *Fenestra* (Channel) (Tubular) Steel Doors as manufactured by DETROIT STEEL PRODUCTS COMPANY.

Note: Specify whether Channel, Tubular or both.

(YS-3) Materials

(YS-3a) Door Frames, etc.—

Note: We strongly recommend that all door frames be included with the Miscellaneous Structural Steel or Ornamental Iron and that they be included under these or similar other specification divisions, for the reason that the frames in all cases should be installed when the building is erected to assure rigid anchorage. Steel doors, on the contrary, should be installed only after the building is erected.

Note: Provide, therefore, that all frames shall be made to the exact dimensions furnished by the Door Manufacturer and that they shall be erected plumb, true and rigidly anchored. Include provisions for slotted, sliding door thresholds and supports for sliding door tracks where these are required.

Note: Where particularly desired, 4" channel frames for swing doors only, will be furnished with the doors at added cost. If required, so specify. (See Fenestra Page 51.)

(YS-3b) Door Panels—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

All panel frame members shall be (equal leg channel) (angle) sections.

Note: Channels are used for channel doors and angles for tubular doors. Include either or both as required.

Muntins shall be 1½" deep. Solid panels shall be of 13 gauge steel.

(YS-3c) Door Stiles and Rails—

- (1) Door stiles and rails shall be of heavy rolled steel channels.
- (2) Door stiles and rails shall be of heavy square steel tubing.

Note: Specify either or both as required.

(YS-3d) Sliding Door Closure and Guide Plates and Meeting Stile Astragals—Closures and guides (and meeting stile astragals) shall be of heavy steel plates.

(YS-4) Construction

(YS-4a) Door Panels—All panel frames shall be mortise and tenon, air hammer riveted, at all corners. Muntins shall be continuous from bottom to top and from side to side, so interlocked at intersections as to increase the rigidity and strength—joints at frames shall be mortise and tenon air hammer riveted. Solid panels shall be secured by angles riveted to the panel frame and muntin members.

(YS-4b) Channel Doors—Channel stiles and rails shall be butted together over solid corner castings, through riveted with countersunk rivets. Stiles and rails shall be riveted to frame of panel. Door stiles shall be reinforced with a steel plate at butts.

(YS-4c) Tubular Doors—Tubular stiles and rails shall be mitered and butt welded at corners. Panel frames shall be attached to stiles and rails with countersunk machine screws.

(YS-4d) Closures—Closure plates at top and back edges of sliding doors shall be attached with countersunk machine screws.

(YS-4e) Guides and Astragals—Guide (and astragal) plates on the face of sliding doors shall be attached with countersunk through rivets.

(YS-4f) Glazing Angles—All glass shall be secured with glazing angles, neatly mitered at angles. Angles shall be secured to frames with brass machine screws and to muntins with machine screws and nuts.

(YS-4g) Hardware Provisions—Stiles, where required, shall be tapped to receive hardware attached at the time of erection.

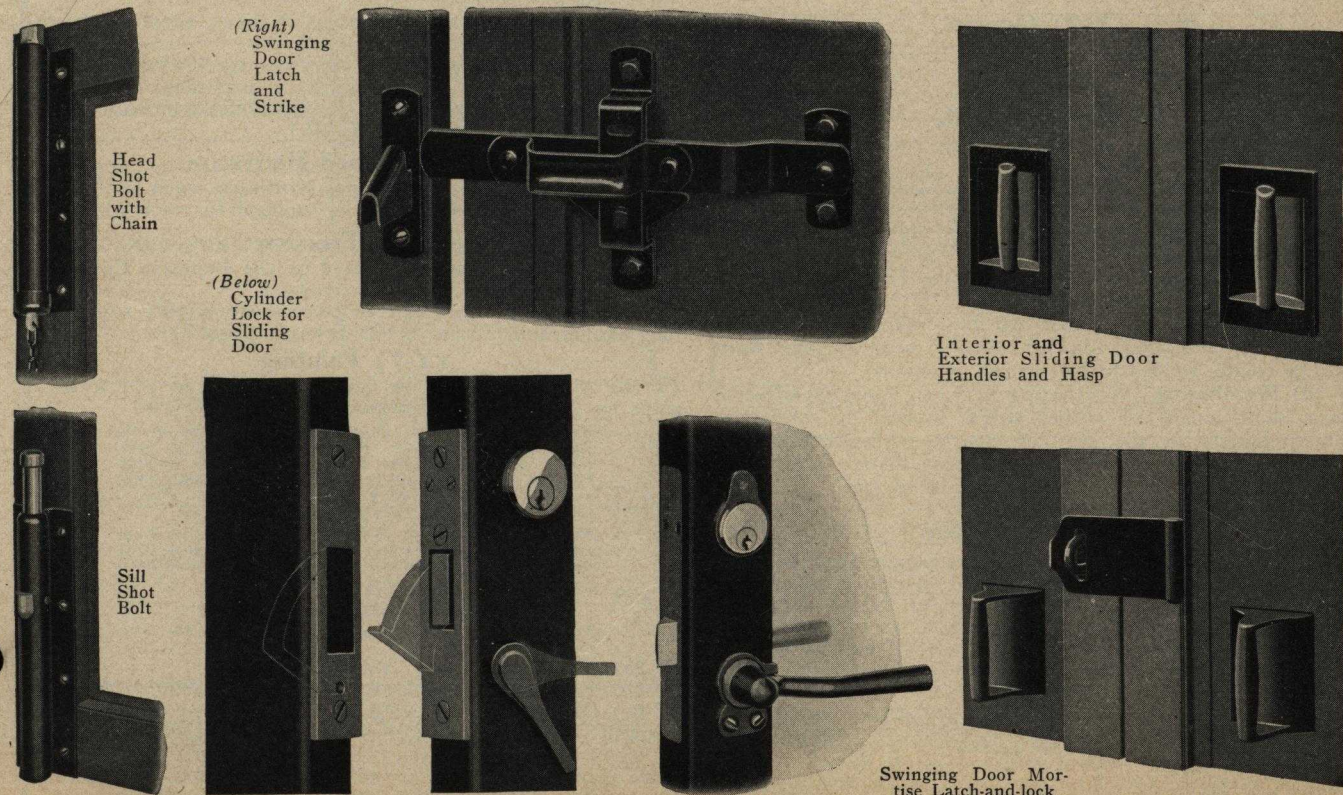
(YS-5) Attached Hardware

Note: Attached at factory.

(YS-5a) Butts—All swinging doors shall be equipped with standard (4½"x4½") (6"x4½") steel butts with non-risable loose pins. The number of butts to each door shall be such as to adequately carry the weight.

Note: 4½"x4½" butts are used on channel doors, 6"x4½" on tubular doors. Include either or both as required.

(YS-5b) Latch-and-Locks—All swinging single doors shall be equipped with standard, bronze face, mortise latch-and-locks.



Swinging and Sliding Door Hardware

Detroit Steel Products Company

Note: Cylinders are installed after erection.

Note: Omit if surface Japanned iron latch and strike are selected. See (YS-6b).

(YS-5c) Sliding Door Handles—All sliding doors shall be equipped with combination flush and projecting iron handles, one to each door, solidly riveted to the steel panels.

(YS-6) Detached Hardware

Note: See Fenestra Page 76.

Note: All detached hardware shall be shipped carefully packed to prevent damage till applied for use.

(YS-6a) Swing Door Cylinders and Handles—All swing doors shall be equipped with malleable iron handles, and bronze faced cylinders and escutcheons.

Note: Use when latch-and-locks are included, see (YS-5b). Where master keying is necessary, we prefer to key to our own system. If cylinder master keying is required, so specify here.

(YS-6b) Swing Door Latches—All swinging doors shall be equipped with surface, Japanned iron door latches and strikes.

Note: Omit if mortised latch-and-locks are selected. See (YS-5b) and (YS-6a).

(YS-6c) Shot Bolts—All fixed leaves of double swing doors shall be equipped with standard surface, spring shot bolts (Japanned iron case and steel bolts). Top bolt shall be chain operated. Bottom bolt shall be foot operated.

(YS-6d) Sliding Door Hasps—All sliding doors shall be equipped with hinged hasps and staples.

(YS-6e) Sliding Door Tracks—All sliding doors shall be equipped with standard steel tracks and adjustable roller bearing trucks, complete with track brackets.

(YS-6f) Special Hardware—

Note: Special hardware, such as standard fire exit panic bolts, standard door checks, etc., will be furnished where desired. If required, so specify.

(YS-7) Erection

(YS-7a) All Steel Doors shall be erected by the FENESTRA CONSTRUCTION COMPANY under a separate contract.

Note: See Paragraph 3, Fenestra Page 1.

(YS-7b) All doors shall be erected in a thoroughly workmanlike manner and left in perfect operating condition.

(YS-7c) Apply all hardware in accordance with the manufacturer's directions.

(YS-8) Painting

All Fenestra Steel Doors shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 3, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.

(YS-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications. See Paragraph 8, Fenestra Page 2.

(YS-9a) Glass—Glass shall be $\frac{1}{4}$ " thick, rough wire.

(YS-9b) Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See Paragraph 9, Fenestra Page 2.

(YS-9c) Glazing—All glass shall be bedded in putty and secured with glazing angles.

Note: Do not paint until putty has thoroughly hardened. See note Paragraph (YS-8).

(Y) AIRPLANE HANGAR DOORS—Specifications

Note: Limitations.

Practical limits are determined largely by shipping facilities, height of tunnels, width of bridges, etc.

(Y-1) Work Included

Note: List and locate.

(Y-2) General

All doors shall be Fenestra Airplane Hangar Doors as manufactured by the DETROIT STEEL PRODUCTS COMPANY.

(Y-3) Materials

(Y-3a) Door Frames, etc.—

Note: All framing to be included with the Miscellaneous Structural Steel or Ornamental Iron and included under other specification divisions.

(Y-3b) Door Panels—Upper panels of doors shall be provided with glass panels constructed of solid rolled steel frame sections and muntain bars of $1\frac{1}{2}$ " depth. Lower panels shall consist of solid 13 gauge steel plates.

(Y-3c) Door Stiles and Rails—All door stiles and rails shall be made of $(2\frac{1}{2} \times 2\frac{1}{2})$ $(3 \times 2\frac{1}{2})$ $(4 \times 2\frac{1}{2})$ steel tubing. Rails shall be solidly welded to stiles at all junctions.

(Y-3d) Weathering—Weathering between doors on adjacent tracks shall consist of rubber strips, secured by continuous metal retainers to the stile of one door, making contact weathering against the stile of adjacent door. Weathering between doors on the same track shall be of steel.

(Y-4) Construction

(Y-4a) Door Panels—Frames of glass panels shall be mortise and tenon, air hammer riveted and welded at all corners. Muntins shall be continuous from bottom to top and from side to side, so interlocked at intersections as to increase the rigidity and strength—joints at frames shall be mortise and tenon, air hammer riveted. Solid panels shall be secured to tube frame.

Note: Where glazing angles are specified all glass shall be secured with glazing angles mitered at corners. Angles shall be secured with machine screws tapped to frame, and with machine screws and nuts to muntins.

(Y-4b) Carriage—All doors shall rest on double flanged, mall-iron wheels so designed as to roll on steel tracks carrying the

entire weight of the doors. Each wheel shall be mounted by housings and plates, and equipped with roller or swivel ball bearings and Alemite lubricated.

(Y-4c) Guides—Bronze bushed malleable iron rollers shall be attached to the head rail of each door, to serve as guides and reduce friction, and minimize the transverse load on structural steel members.

(Y-4d) Pilot Doors—(Hinged pilot doors supplied as specified.)

(Y-4f) Swing Doors—Unless otherwise specified a swing door to fold back against the wall, will be furnished at each end of the door opening, to provide track clearance for curved track type doors. (See plate Y-122.)

(Y-5) Attached Hardware

(Y-5a) Locks—Suitable locking, hardware, such as friction bolts, cremone bolts, etc., shall be supplied for each door.

(Y-6) Erection

(Y-6a) All doors shall be erected by the Fenestra Construction Company under a separate contract.

(Y-6b) All doors shall be erected in a thoroughly workmanlike manner and left in perfect operating condition.

(Y-7) Painting

(Y-7a) All doors shall be given one coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications: One additional coat of paint should be applied after erection and before glazing. Further painting should be deferred until at least three weeks after glazing, to permit putty to set. One or additional coats may then be applied as desired.

Note: Where desired, the Fenestra Construction Company will do field painting after erection, at reasonable added cost. If required, so specify here, including specification for paint and its application.

(Y-8) Glass and Glazing

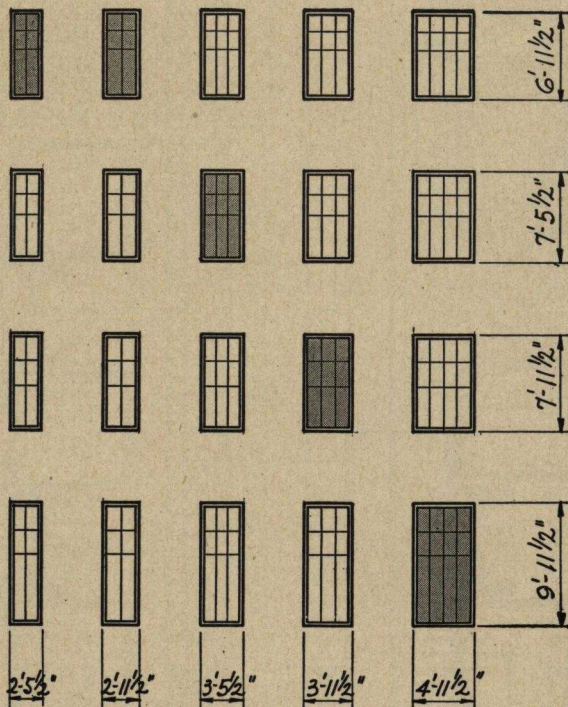
Note: The following should be included in the Glazing Specifications.

(Y-8a) Glass shall be $\frac{1}{4}$ " thick, rough wire.

(Y-8b) Putty shall be a high grade of steel window putty.

(Y-8c) Glazing—All glass shall be set in bed of putty and secured by copper plated, steel spring, glazing clips furnished by the door manufacturer. (4 clips for each light). Face putty shall be applied in a neat, clean-cut, smooth manner.

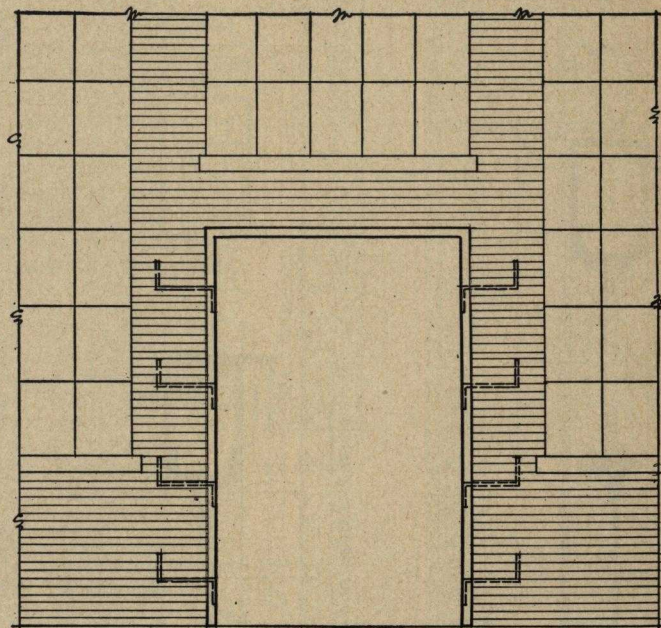
Note: Do not paint until putty has thoroughly hardened. See note Paragraph Y-7).



• STANDARD • AND • STOCK • TYPES •
TYPES SHOWN SHADED ARE CARRIED IN STOCK

NOTE - THE ABOVE UNITS WILL BE MADE WITH CHANNEL TRIM AND CAN BE USED FOR EITHER SWING OR SLIDING DOORS.

DIMENSIONS SHOWN ARE OVERALL DOOR SIZES WITH OPENING CLEARANCES DEDUCTED. FOR CLEARANCES SEE PLATE NO. V-102.

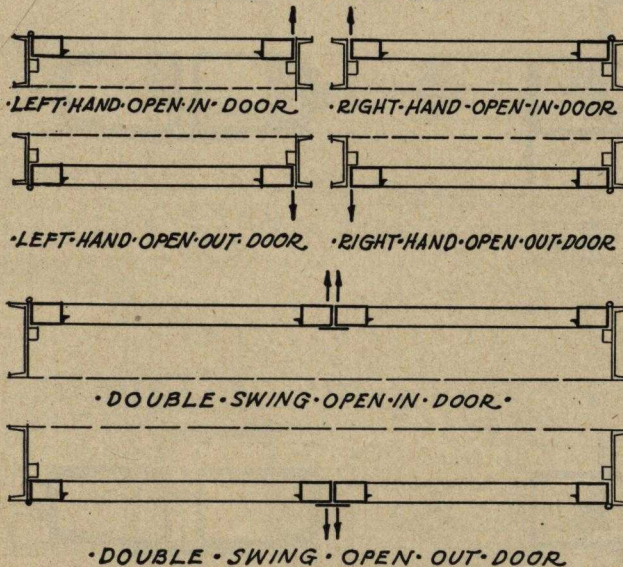


• ELEVATION • OF • TYPICAL • DOOR • FRAME •

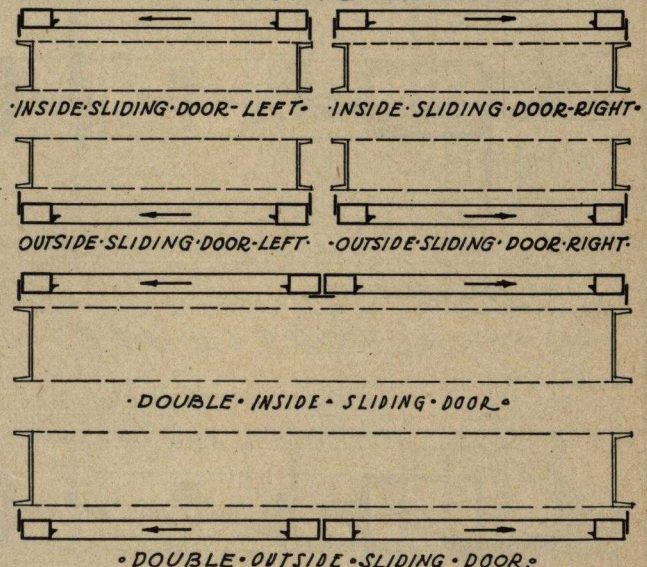
NOTE - STANDARD DOOR FRAMES FOR SWING DOORS ONLY ARE MADE OF 4" STRUCTURAL STEEL CHANNEL AND ARE EQUIPPED WITH HEAVY ZEE ANCHORS ON EACH SIDE SPACED ABOUT 2'-0" ON CENTERS TO ANCHOR FRAME INTO THE MASONRY. HOLES IN FRAME FOR HINGES ARE DRILLED AND TAPPED IN SHOP TO MATCH DOORS.

FRAMES FOR SINGLE DOORS ARE SHIPPED ASSEMBLED, USING AN ANGLE TIE ACROSS THE BOTTOM. FRAMES FOR DOUBLE DOORS ARE SHIPPED KNOCKED DOWN AND MUST BE BOLTED TOGETHER IN FIELD.

• SWING • DOORS •



• SLIDING • DOORS •

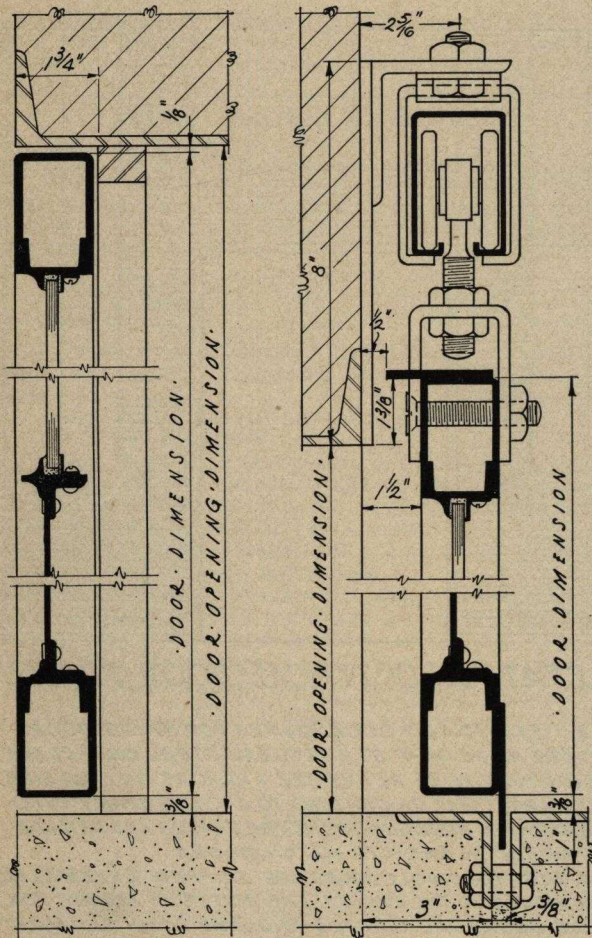


• D E S I G N A T I O N • O F • D O O R S •

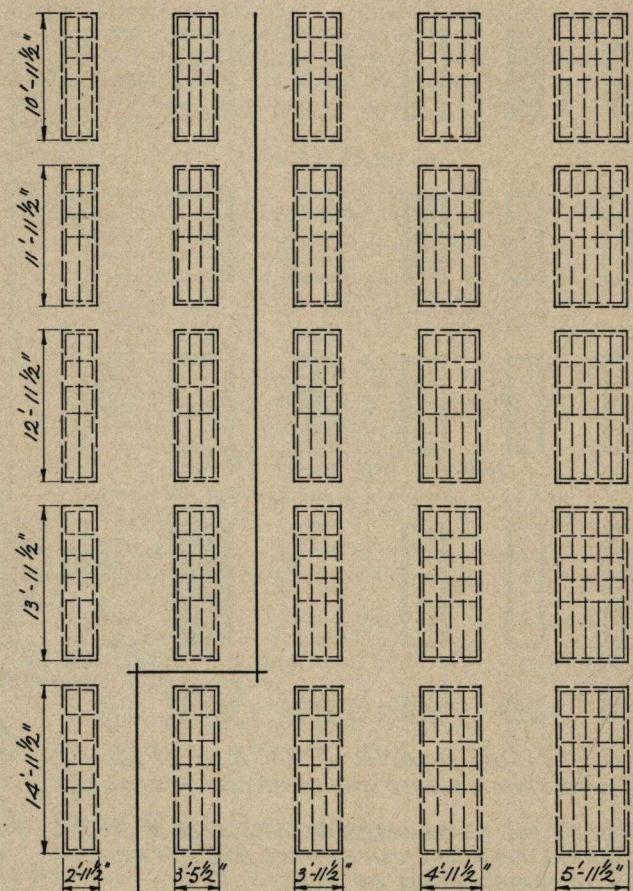
Fenestra
August 1929

Swinging and Sliding Doors
Types, Sizes and Handing

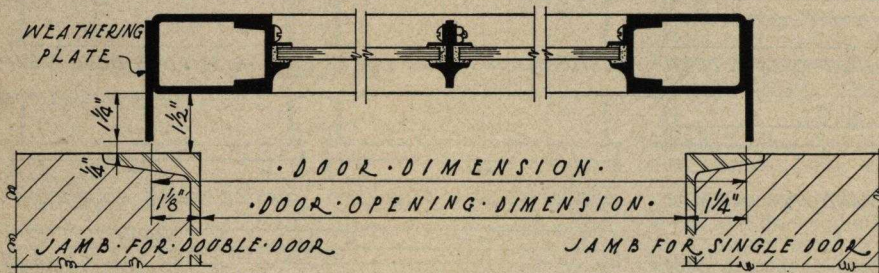
Plate No
V-101



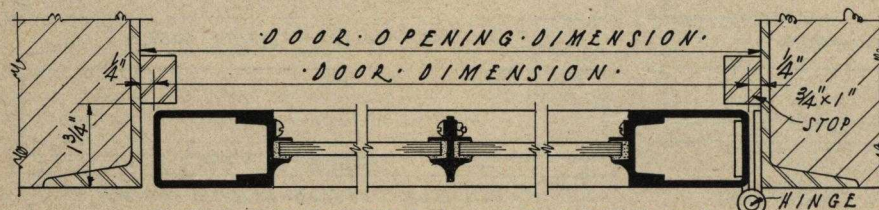
• VERTICAL SECTION • SWING DOOR •
• VERTICAL SECTION • SLIDING DOOR •



• LISTED SPECIAL TYPES •



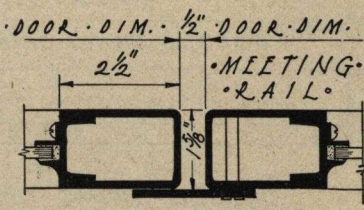
• HORIZONTAL SECTIONS • SLIDING DOORS •

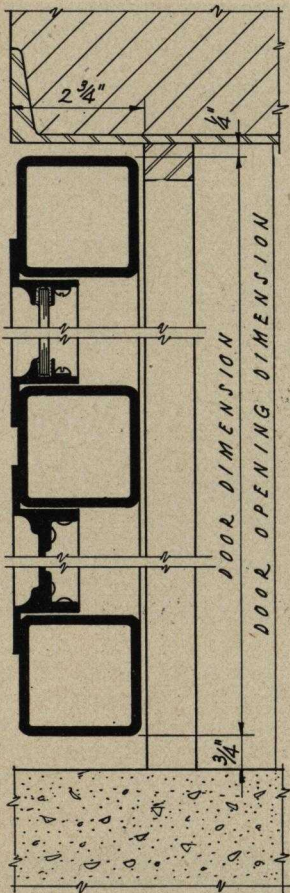


• HORIZONTAL SECTIONS • SWING DOORS •
• SCALE: 3" = 1'-0" •

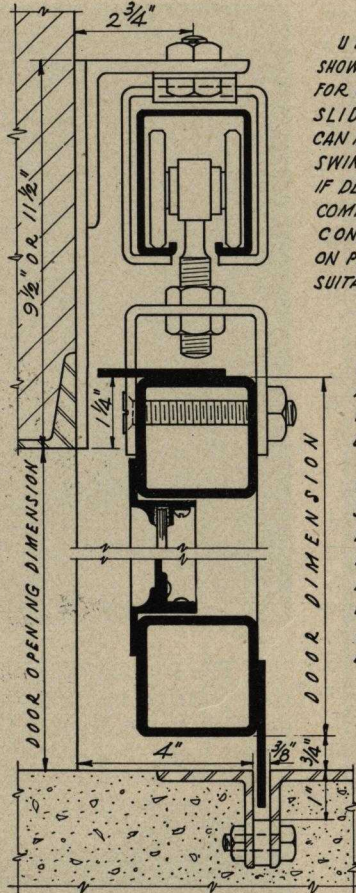


• MEETING RAIL •





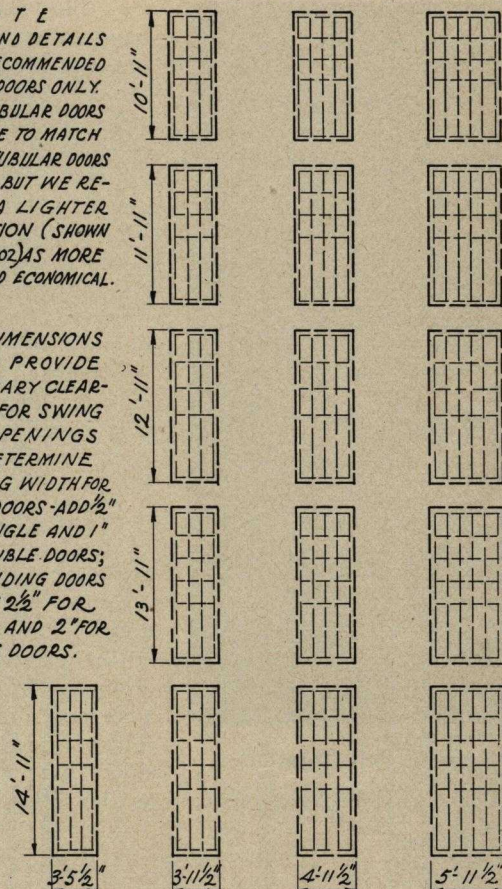
• VERTICAL SECTION •
• SWING DOOR •



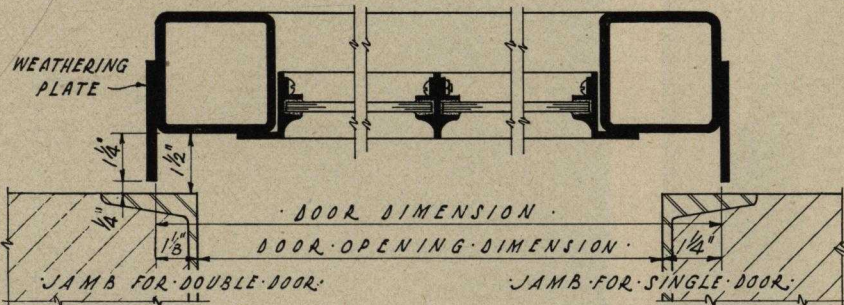
• VERTICAL SECTION •
• SLIDING DOOR •

NOTE
UNITS AND DETAILS
SHOWN ARE RECOMMENDED
FOR SWING DOORS ONLY.
SLIDING TUBULAR DOORS
CAN BE MADE TO MATCH
SWINGING TUBULAR DOORS
IF DESIRED BUT WE RE-
COMMEND A LIGHTER
CONSTRUCTION (SHOWN
ON PLATE V-102) AS MORE
SUITABLE AND ECONOMICAL.

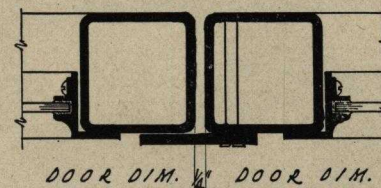
DOOR DIMENSIONS
GIVEN PROVIDE
NECESSARY CLEAR-
ANCES FOR SWING
DOOR OPENINGS
TO DETERMINE
OPENING WIDTH FOR
SWING DOORS ADD 1/2"
FOR SINGLE AND 1"
FOR DOUBLE DOORS;
FOR SLIDING DOORS
DEDUCT 2 1/2" FOR
SINGLE AND 2" FOR
DOUBLE DOORS.



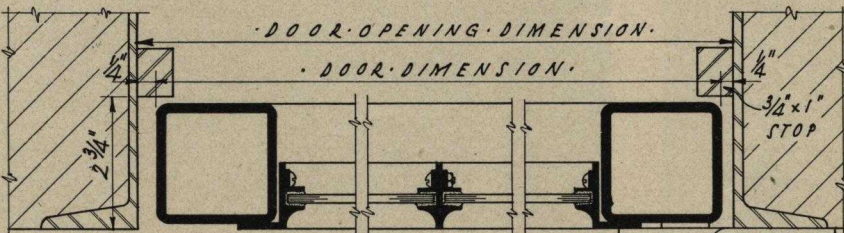
• LISTED SPECIAL TYPES •



• HORIZONTAL SECTIONS • • SLIDING DOORS •

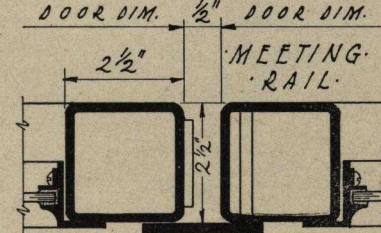


• MEETING RAIL •

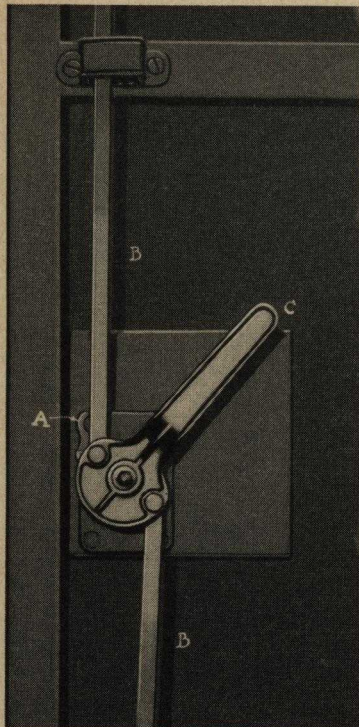


• HORIZONTAL SECTIONS • • SWING DOORS •

• SCALE: 3"=1'-0"



AIRPLANE HANGAR DOORS—FITTINGS AND HARDWARE

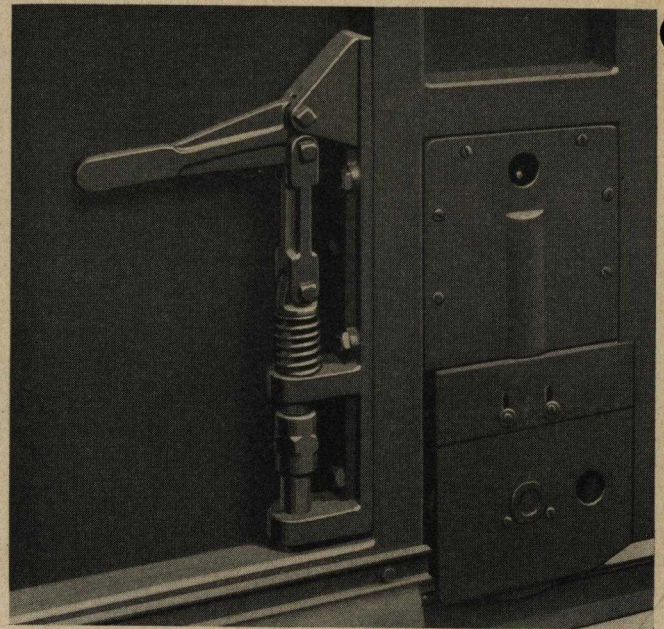


Cremone Bolt (Interior)

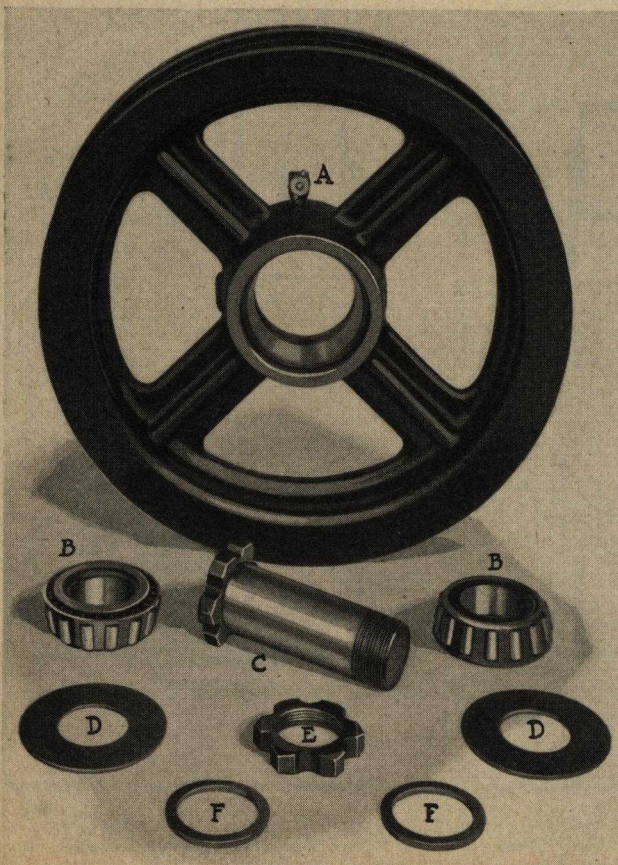
Timken thrust bearings, as well as the roller bearings.

The hardware used on Fenestra Hangar Doors is designed to insure efficient operation, ease in handling and economy in maintenance. The cremone bolt (at left) is used on swing doors located at the end of each run of round-the-corner doors. The bolt can be operated from the exterior by means of a handle set in a recess in the kick-plate.

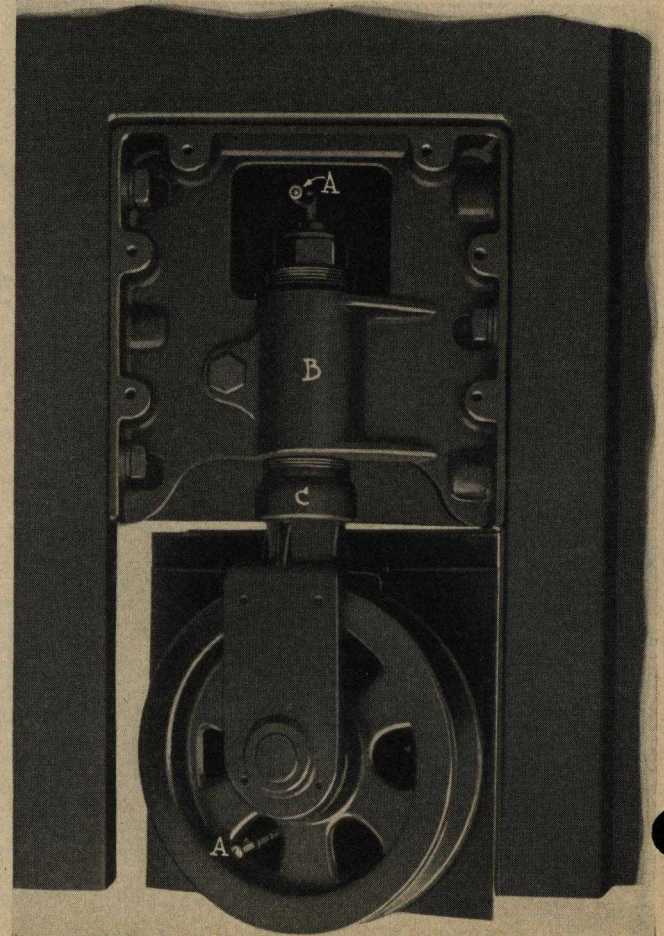
The entire weight of the door rests upon the bottom rollers. These rollers are equipped with Timken roller bearings and Alemite fittings for pressure lubrication. The round-the-corner door has a set of



The friction bolt illustrated above forms an effective positive lock for the door in any position. By depressing the handle, the weight of the door is transferred from the bottom roller to the bolt shaft, which comes in contact with the rail on which the door rests.

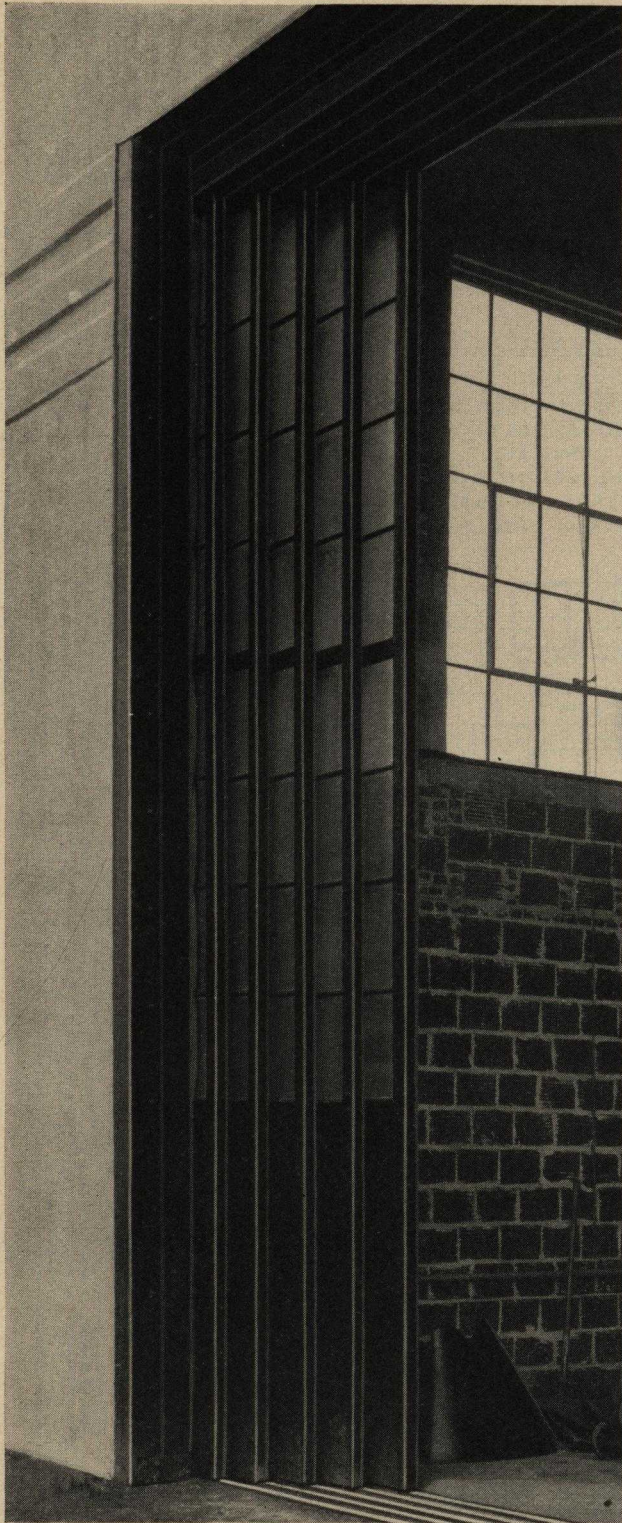


Bottom Roller Assembly



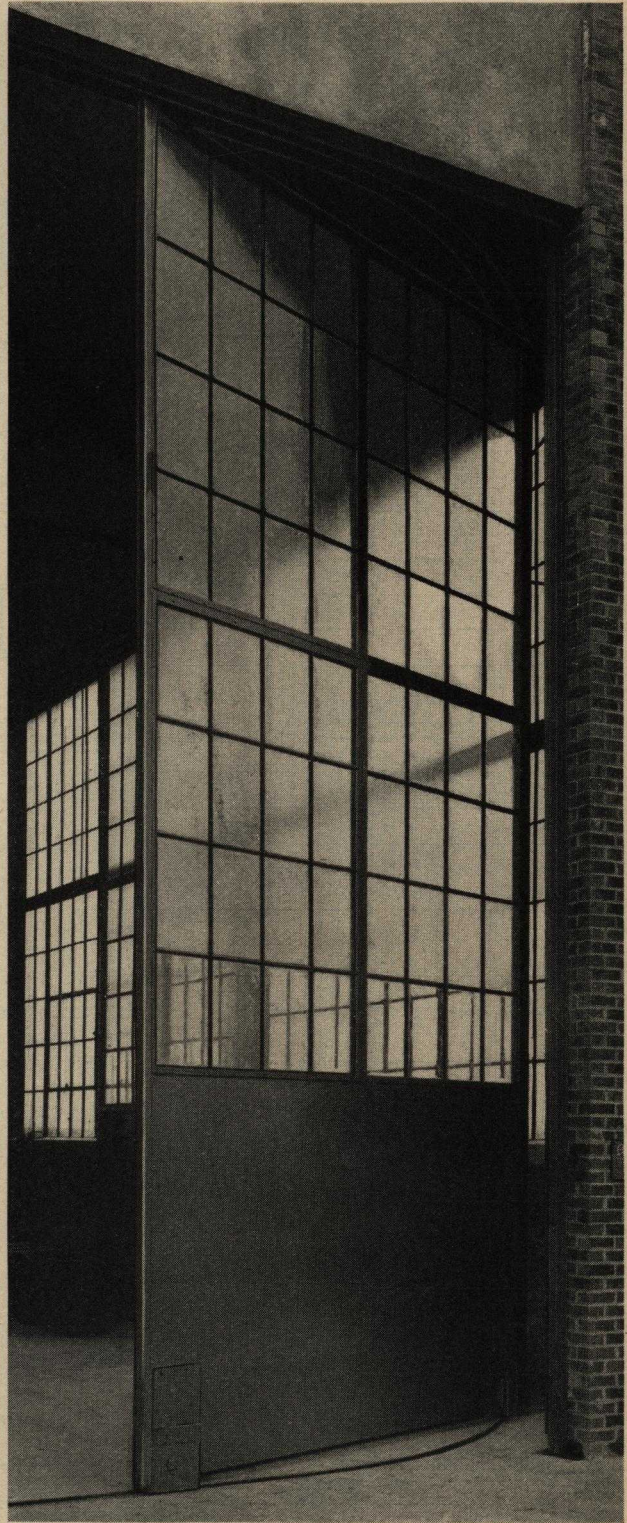
Roller for Round-the-Corner Door

AIRPLANE HANGAR DOORS—OPERATION



The Straight Sliding Type of Fenestra Hangar Door

Rolls back into a rebate or "A" frame provided for that purpose. The illustration shows five units (representing fifty feet or one-half of a hundred-foot opening) in the open position. The heavy, steel tubes, which form the stiles and rails, insure rigidity and weathertightness.



The Round-the-Corner Type of Fenestra Hangar Door

Rolls back against the interior wall of the hangar, and permits a clear opening for the handling of ships. Note the large glass area, over two-thirds of the door being glazed. An abundance of natural daylight is obtained with the door in either the open or closed position.

TYPES AND SIZES ~ DETAILS OF CONSTRUCTION

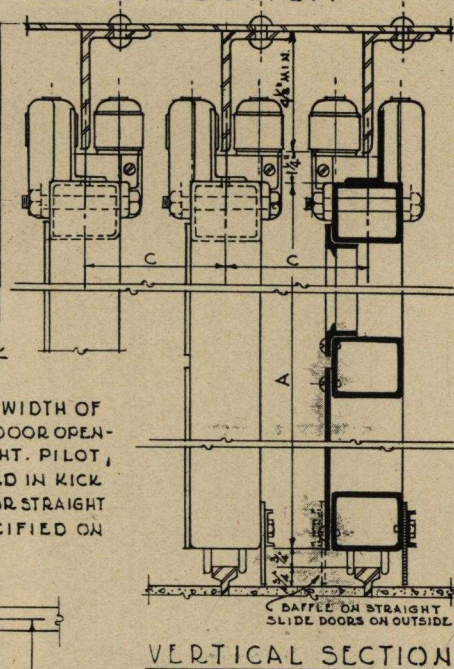
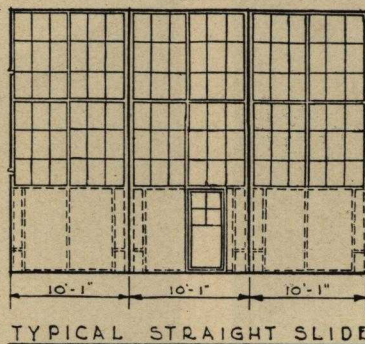
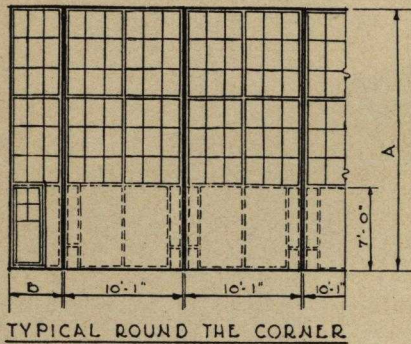
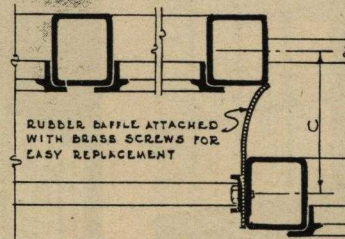


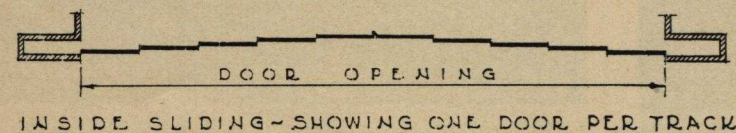
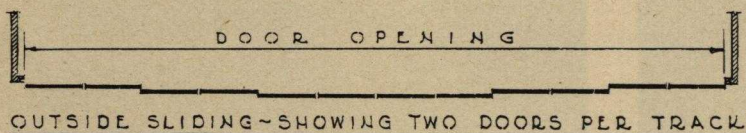
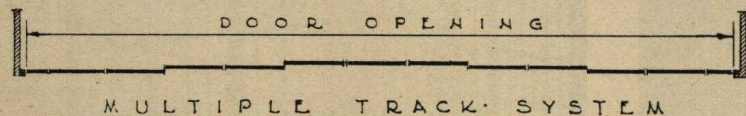
TABLE OF STANDARD SIZES		
ALL ROLLING DOORS ARE 10' WIDE		
HEIGHT OF DOOR (DIM. "A")	SIZE OF TUBE	TRACK SPACING DIM. "C"
16'-0"	2 1/2" x 2 1/2"	5 1/4"
18'-0"	2 1/2" x 2 1/2"	5 1/4"
18'-0"	3" x 2 1/2"	6"
20'-0"	3" x 2 1/2"	6"
22'-0"	3" x 2 1/2"	6"
22'-0"	4" x 2 1/2"	7"
25'-0"	4" x 2 1/2"	7"
28'-0"	4" x 2 1/2"	7"

NOTE
FOR DIMENSION "B" - WIDTH OF END SWING DOORS-SEE DOOR OPENING TABLE AT LOWER RIGHT. PILOT DOORS WILL BE FURNISHED IN KICK PLATE OF ANY END SWING OR STRAIGHT SLIDE DOOR WHEN SPECIFIED ON ORDER.



TYPICAL HORIZONTAL SECTION.

TYPICAL DOOR OPENINGS



PATENTS PENDING

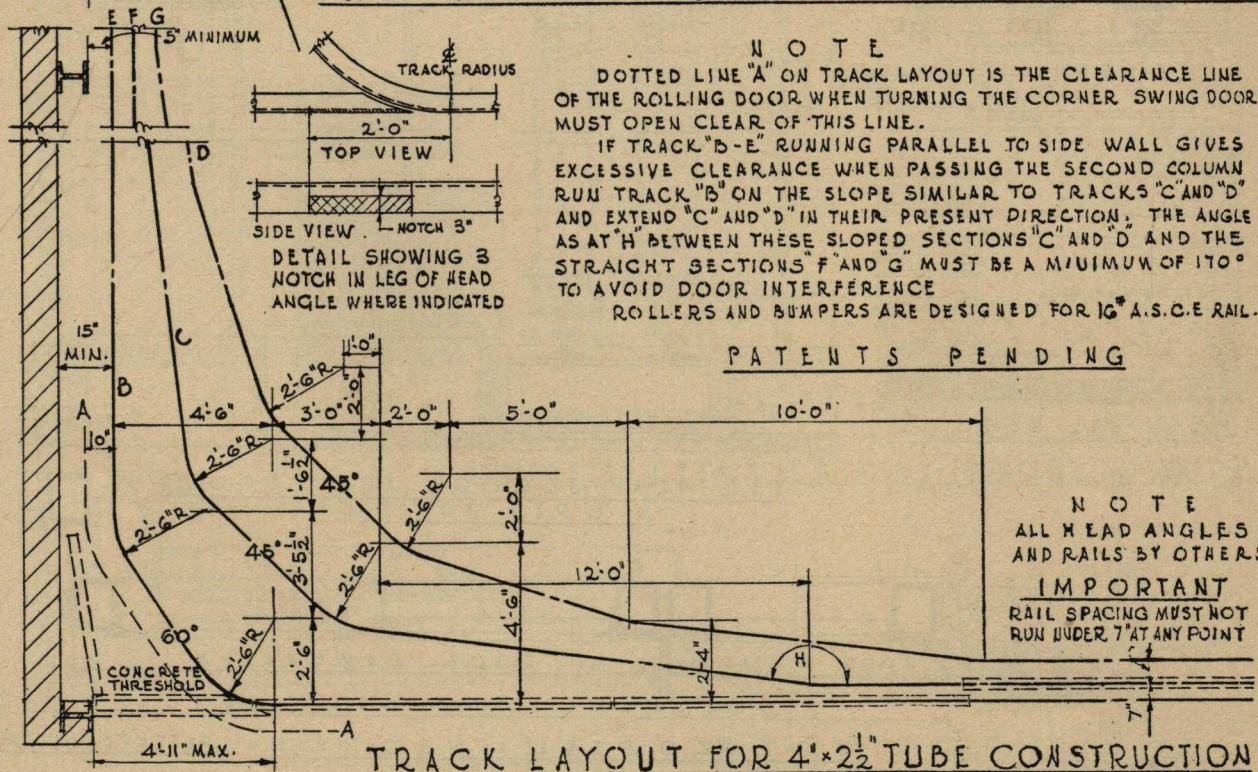
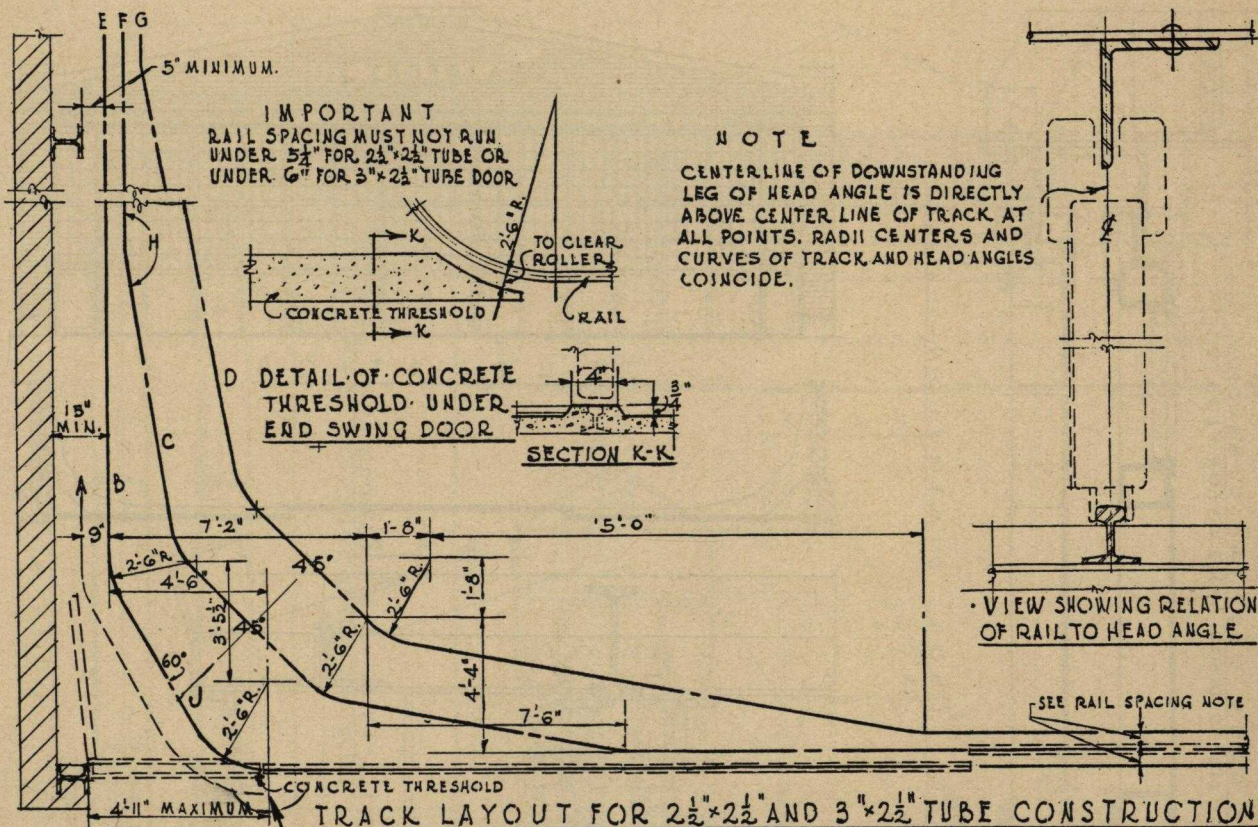
DOOR OPENING	NO. OF 10'-1" ROLLING DOORS	NO. OF TRACKS	DIM. "B" - END SWING DOOR 2 REG.
50'-0"	4	1	4'-8"
60'-0"	5	1	4'-8"
70'-0"	6	2	4'-8"
80'-0"	7	2	4'-8"
80'-0"	7	1	4'-6"
90'-0"	8	2	4'-8"
90'-0"	8	1	4'-6"
100'-0"	9	2	4'-8"
100'-0"	9	1	4'-6"
110'-0"	10	2	4'-6"
120'-0"	11	3	4'-6"
130'-0"	12	3	4'-6"
140'-0"	13	3	4'-6"
150'-0"	14	3	4'-6"
160'-0"	15	3	4'-6"

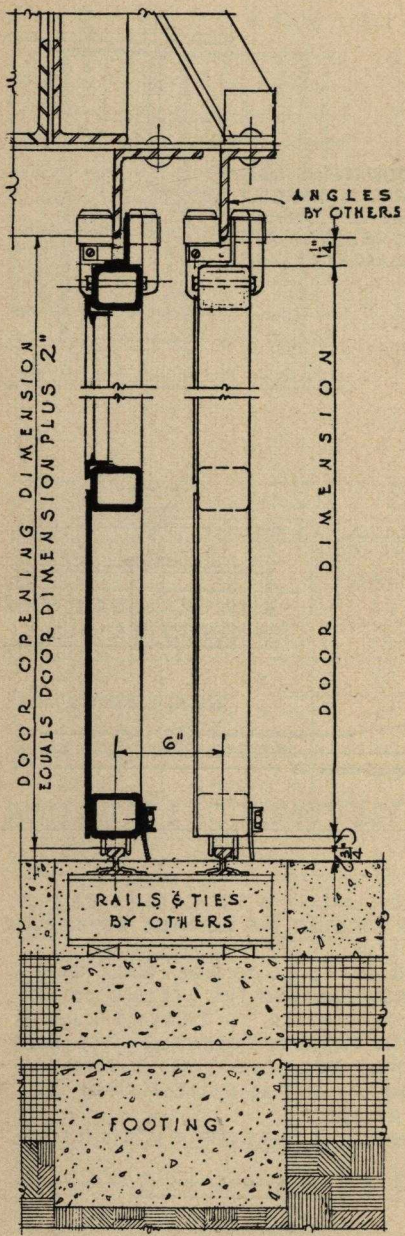
DOOR OPENING	NO. OF DOORS IN OPENING	NO. OF TRACKS	DOORS PER TRACK
50'-0"	5	3	1
60'-0"	6	3	1
70'-0"	7	4	1
80'-0"	8	2	2
80'-0"	8	4	1
90'-0"	9	3	2
90'-0"	9	5	1
100'-0"	10	3	2
100'-0"	10	5	1
110'-0"	11	3	2
120'-0"	12	3	2
130'-0"	13	4	2
140'-0"	14	4	2
150'-0"	15	4	2
160'-0"	16	4	2

Fenestra
August 1929

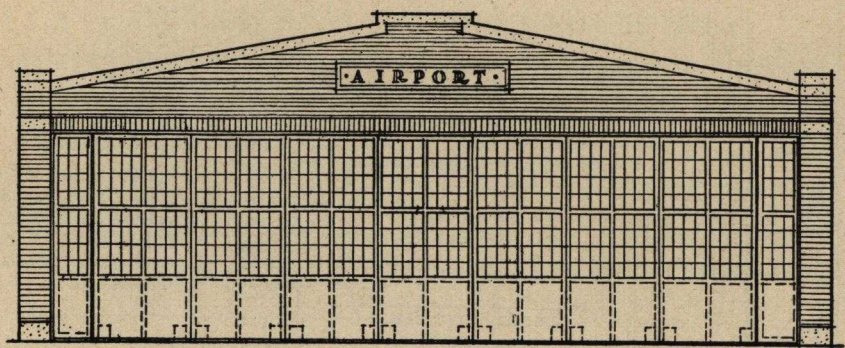
Airplane Hangar Doors
Types and Sizes

Plate No
Y-122

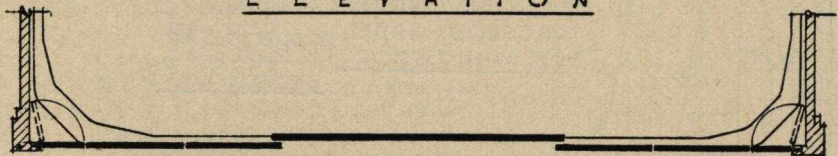




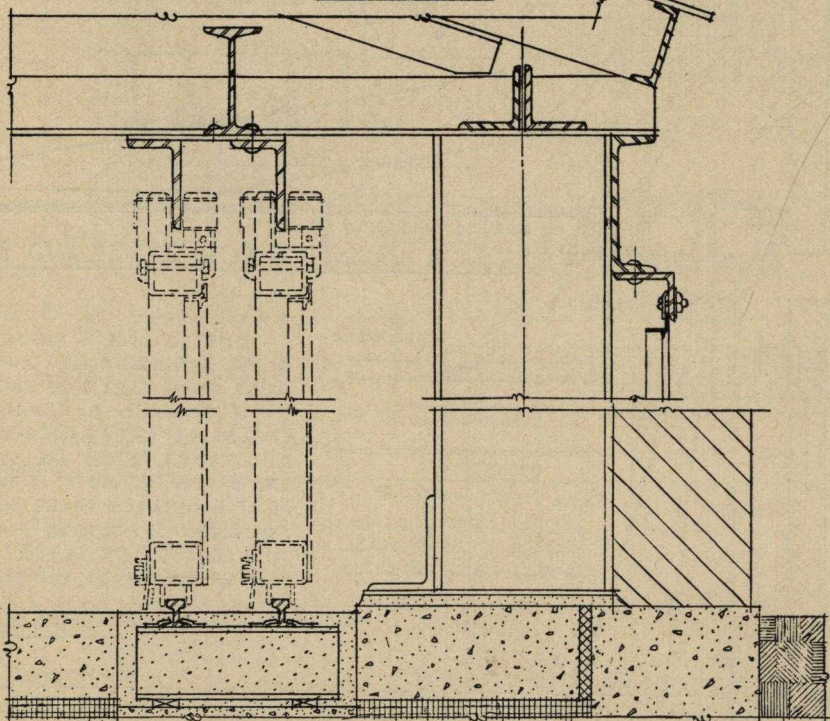
VERTICAL SECTION



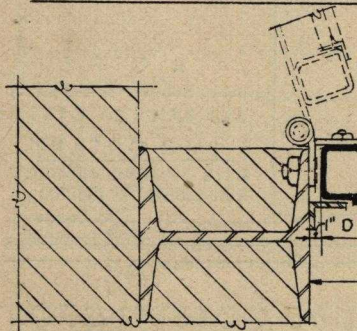
ELEVATION



PLAN



VERTICAL SECTION THRU DOORS
IN OPEN POSITION

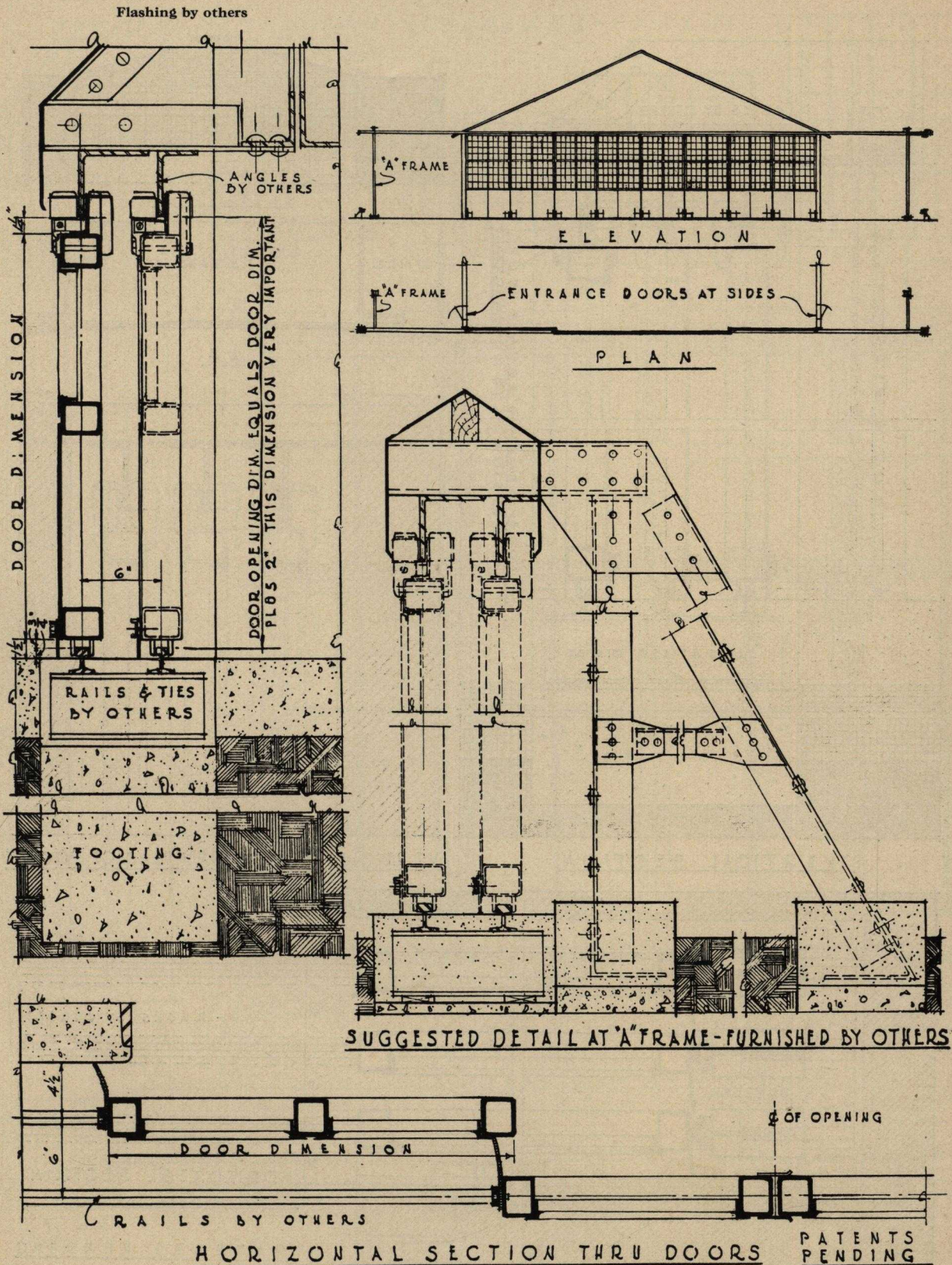


HORIZONTAL SECTION PATENTS PENDING

Fenestra
August 1929

Airplane Hangar Doors
Span Truss Construction

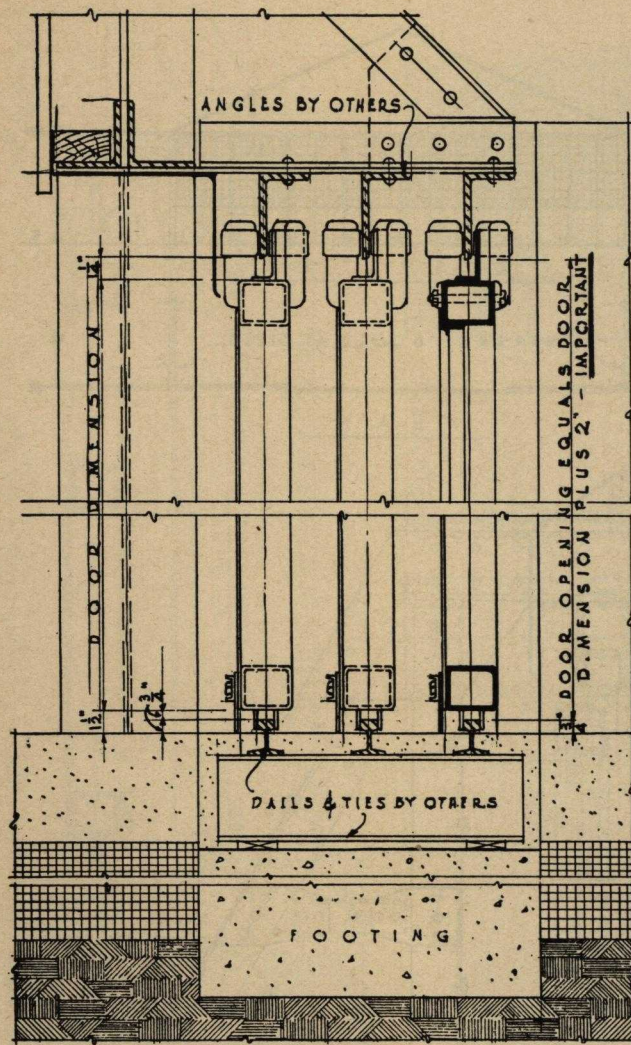
Plate No
Y-124



Fenestra
August 1929

Airplane Hangar Doors
A-Frame Construction

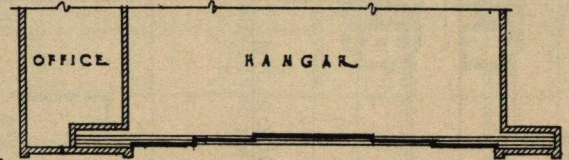
Plate No
Y-125



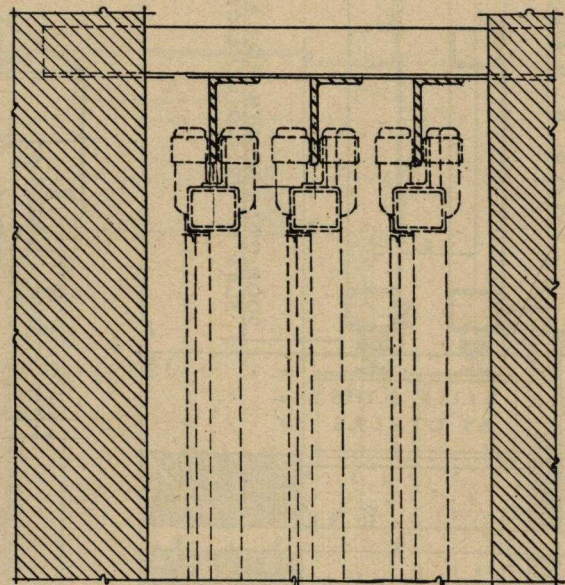
VERTICAL SECTION



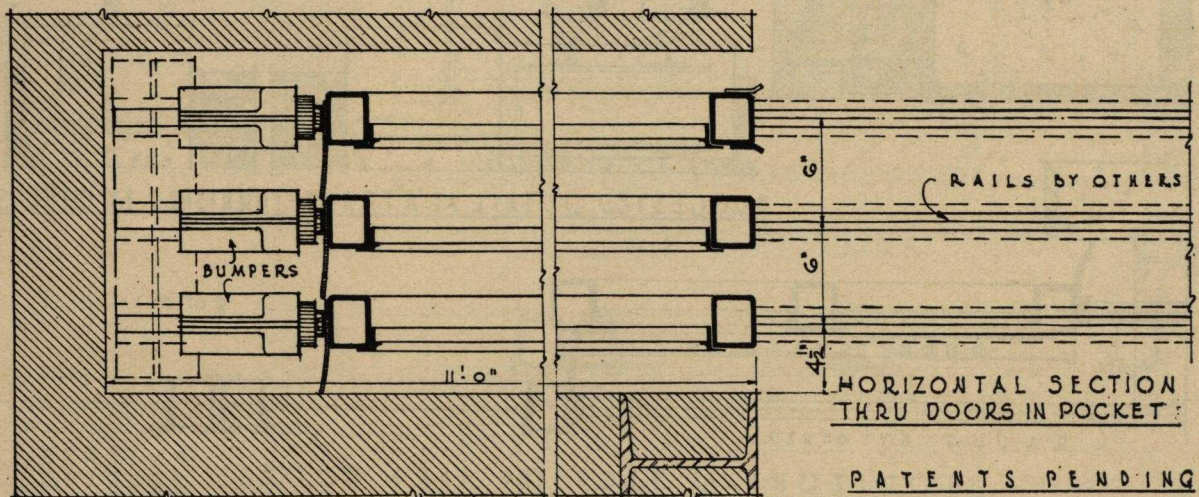
ELEVATION



PLAN



VERTICAL SECTION THRU HEAD OF POCKET

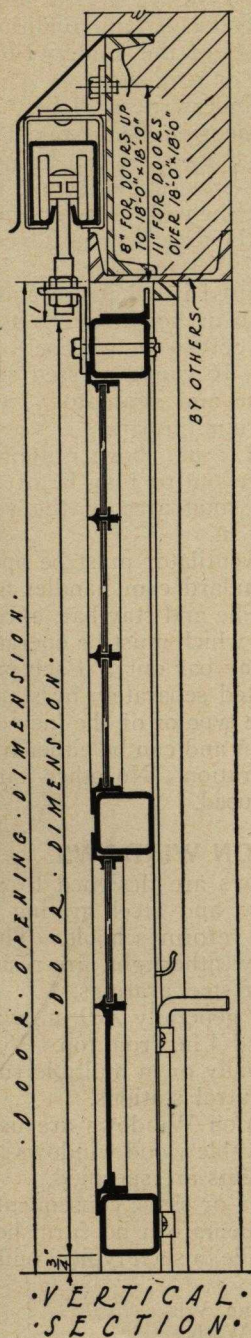


PATENTS PENDING

Fenestra
August 1929

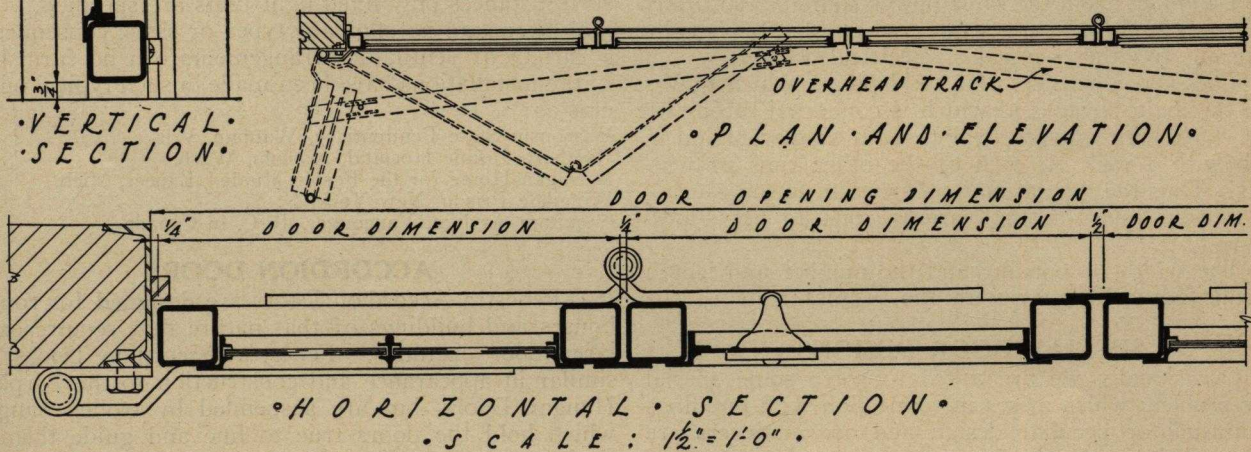
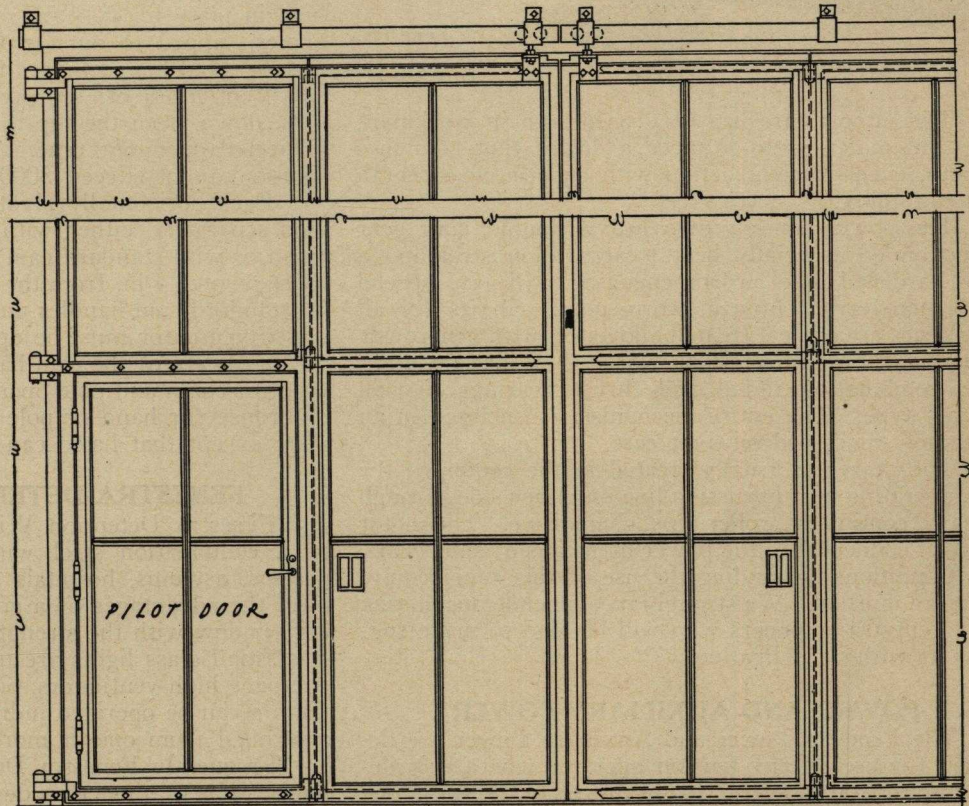
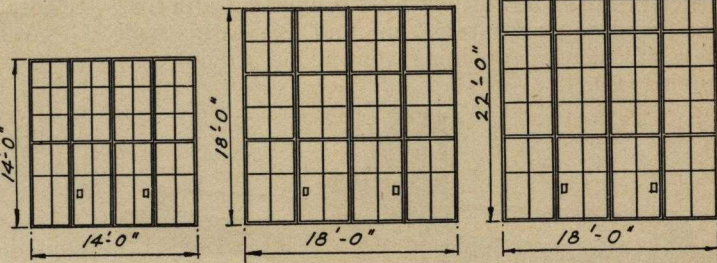
Airplane Hangar Doors
Wall Pocket Construction

Plate No
Y-126



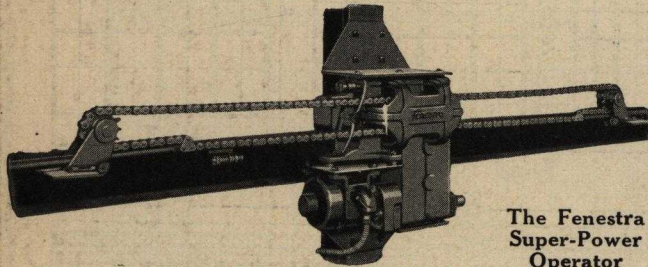
NOTE - THESE DOORS ARE LIMITED TO 18'-0" IN WIDTH AND 22'-0" IN HEIGHT. GLAZING ANGLES ARE SUPPLIED BUT DOORS ARE FURNISHED UNGLAZED. THEY ARE EQUIPPED WITH NECESSARY HARDWARE INCLUDING TRACK WITH HANGERS AND TROLLEY, DOOR PULLS, CASE BOLTS AND HINGES. PILOT DOORS MAY BE INSERTED IN ANY UNIT IF DESIRED.

STANDARD TYPES



SUPER-POWER OPERATOR

For exceptionally large industrial buildings where unusual operating service is desired on long runs of continuous top hung windows, we are prepared to supply the Fenestra Super-power which, in connection with continuous operator transmission line and lever arms, will handle conveniently top hung continuous windows in runs up to 600 ft.



The Fenestra
Super-Power
Operator

The utmost care has been used both in workmanship and materials to produce a device that combines smooth, even, efficient action with superlative strength and durability.

The power consists of a heavy, double, spur gear reduction of especially heat treated alloy steel and a case hardened steel worm engaging a heavy, special alloy, non-ferrous bronze, worm gear. Shafts for all spur gears are of heat treated alloy steel with generously proportioned bearings. The worm shaft has, in addition, combination radial and thrust bearings of ball bearing type. The entire mechanism is enclosed in an accurately machined oil-tight case.

The power is usually located in the center of the run, operating a transmission line on either side through a heavy, continuous, roller type, chain drive. The motor is direct connected to the power by means of spur gears.

Conditions demanding the use of this super equipment are unusual. We strongly recommend consultation with Fenestra engineers who will be glad to make suggestions without obligation.

POWER AND AUXILIARY POWER

The Fenestra Power and Auxiliary Power are designed for use on any tension operator where it is desired to operate several banks or runs of sash, one above another, from the same power station. Naturally it is used chiefly with continuous operator and is equally applicable to either manual or electrical control.

The device consists of a steel pinion which moves with the main power and which is connected through a steel shaft with universal joints, to a similar pinion in mesh with a rack on each of the other runs of windows. Thus the several pinions move in unison causing the tension lines on the various runs to act simultaneously.

The width of opening and the number and length of runs naturally vary with the requirements of the job.

SPECIAL DOOR DESIGNS

Occasionally we are asked to solve some special door problem which arises in connection with buildings of unusual or peculiar design and our engineers are always glad to co-operate on such requests.

A typical example of this service was the design and manufacture of 20 Fenestra vertically sliding doors for the Detroit Seamless Steel Tube Company. These doors were operated by a worm and gear device connected by means of a steel shaft to pulleys over which the doors were counterbalanced against counterweights.

UNDERWRITERS' WINDOWS

In most buildings, standard Fenestra steel windows afford ample fire protection. Under certain conditions, however, types carrying the label of the Underwriters Laboratories, Inc., are desirable or required.

Windows bearing the Underwriters' label are limited to 7x12 ft., either dimension being taken as height or width. Multiples of these sizes can be used to any width by the use of the standard Fenestra T-bar mullion between units, providing the width between mullions does not exceed 7 ft. and the area does not exceed 84 sq. ft.

$\frac{1}{4}$ -in. wire glass must be used in all panes and is limited to 48 in. in either width or height and a total exposed area of not more than 350 sq. in. Glass to be held in place by $\frac{7}{8}$ x $\frac{5}{8}$ x No. 16 gauge pressed steel angles, tapped to outside frame and ventilator frame members but bolted through all muntin bars.

Ventilators can be pivoted 2 in. above center or 4 in. down from the top to open out or may be of the projected open out type. The total area of the ventilators cannot exceed 3000 sq. in.

Each horizontally pivoted ventilator must be operated separately, either with standard cam handles and chain or with standard cam handle and stay bar, except those pivoted 4 in. from the top which must be operated by standard cam handles and stay bar only. Each projected ventilator must be operated separately by standard hardware of the cam handle type or of the kick out type for chain and pole operation and can be either iron or bronze for hand or pole operation. No other hardware except that listed can be used.

FENESTRA DETENTION WINDOWS

Fenestra Detention Windows are designed to act as a combination steel window and steel grating in prisons, asylums, hospitals and reform schools. They offer the advantages of a good weathertight, fire-resisting window with the strength of steel gratings.

Small glass lights are used, generally 7x9 in., with one pane high ventilators, pivoted 4 in. from top. Ventilators can be operated individually or in multiple runs controlled from one or more central stations.

Frequently Fenestra Detention Windows are used unglazed as gratings outside movable wood windows; in such instances only fixed light units are specified.

There are no standard types or sizes, consequently a variety of ventilator arrangements can be furnished. Large installations have been made in such typical buildings as:

Wisconsin State Penitentiary, Waupun, Wis.
Northern Insane Hospital, Norlum, Wash.
Michigan Home for the Feeble Minded, Lapeer, Mich.
Wingdale Prison, New York, N. Y.
Coquitam Asylum, Vancouver, B. C. in Canada

ACCORDION DOORS

Fenestra Accordion Doors are designed for round-houses and buildings of that nature that require extra large door openings. Fenestra Accordion Doors are similar in appearance and construction to the Airplane Hangar Doors, but are suspended by trolley hangers which hold the doors true to line and guide them as they are opened. (See Plate on Page 61.)

The jamb hinges consist of a strap made of heavy steel which extends entirely across the door. The double eye pintle has a large steel pin. Pilot doors can be installed where desired and are constructed of $2\frac{1}{2}$ x $2\frac{1}{2}$ in. tubular trim. Pilot doors are equipped with cylinder locks while main doors are fitted with hasp and staple so they can be locked with padlock.

Fenestra

for all industrial structures
commercial buildings
schools and institutions
homes and apartments

Detroit Steel Products Company
2250 East Grand Boulevard
Detroit, Michigan